the OIL AND GAS JOURNAL

IT'S WORLD-WIDE INVENTORY TIME IN THE OIL PATCH

For the men who drill and produce the oil wells of the world, the International Petroleum Exposition at Tulsa is a time for stock-taking. It's the time for counting the gains made in the development of new tools and new equipment to drill oil wells faster, safer and deeper, and to produce them more efficiently.

Again, the Hughes building, a reproduction of the Hughes trade-mark, will be a center of interest and a meeting place for the men of the drilling industry. This trade-mark has long symbolized leadership and progress —and is recognized throughout the world—wherever rotary drilling is done.

PRICE 50 CENTS TABLE OF CONTENTS ON PAGE 1 **MAY 11, 1953**

see the C&I exhibit

In the Texas Building
Booths No. 85-86-125-126

INTERNATIONAL PETROLEUM EXPOSITION

All eyes will be on the International Petroleum Exposition at Tulsa, Okla., May 14th to 23rd inclusive . . . and many of them, we hope, will see our exhibit in the Texas Building. There you will find complete information on Hortonspheres, Hortonspheroids, Horton Floating Roofs, Hortondome Roofs, Vaporspheres, Vaportanks, refinery towers and other steel plate structures.

Be sure to ask about our Field Welding Supervisory Service. It's the service that makes sure you get the best structure possible for your money at *no extra cost to you.*

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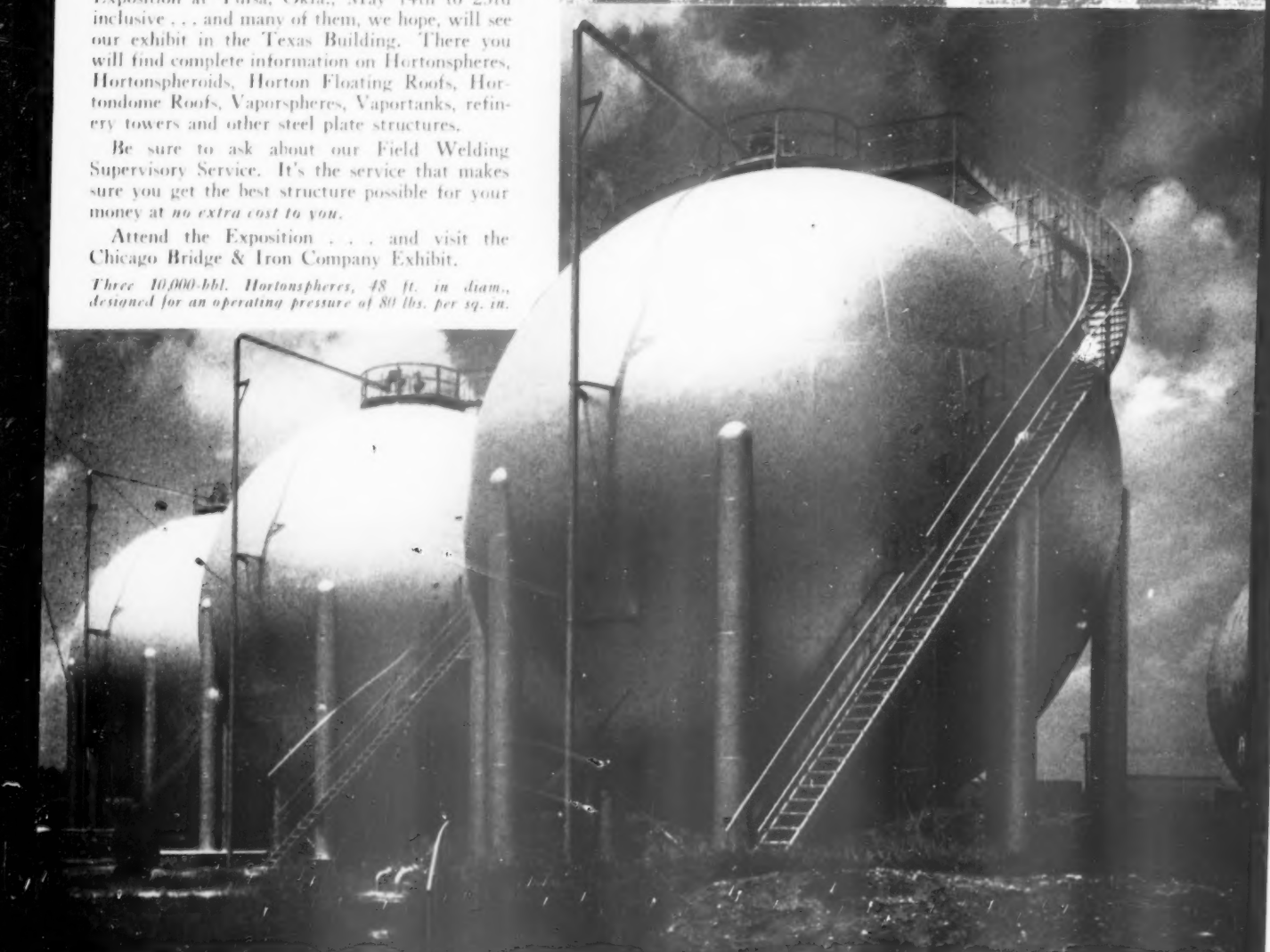

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In Brief . . .

1. OFFSHORE CORING . . . Extensive core-drilling operations are being carried out off the California coast to determine the age of formations outcropping beneath the Pacific Ocean. Data obtained are being used to supplement those gained from seismic operations. Operations are carried out in water depths varying from 15 to 1,100 ft. Standard Oil Co. of California, Humble Oil & Refining Co., and General Petroleum Corp. are cooperating in the project.

•

2. LARGEST CRUDE LINE . . . West Texas Gulf Pipe Line Co.'s line from West Texas to the Gulf Coast is largest size and has largest capacity of any crude-oil line in the United States. The 26-in. carrier is 577 miles long; cost $42,000,000; has ultimate capacity of 440,000 bbl. per day. Six semiautomatic pumping stations have total of 29,800 installed horsepower.

•

3. INCREASED ULTIMATE RECOVERY . . . Application of bottom-hole chokes and production packers to both flowing and pumping wells to induce back pressure has resulted in greatly increased recovery. Bottom-hole chokes are recommended for all flowing wells to limit production to a rate of 50 bbl. of oil per well per day. Packers or retainers in conjunction with chokes are recommended for pumping wells, to enable accurate withdrawals at high pump efficiencies.

•

4. BETTER WELL COMPLETIONS . . . Mixtures of dilute hydrochloric acid and a detergent of the aromatic sulfonic acid class have a marked effect in increasing the effective permeability of sands containing bentonite. Volume of solution for treatment depends primarily upon thickness and porosity of the formation. However, 500 to 1,000-gal. treatments are the most popular.

•

5. FLEXIBLE REFINERY . . . British American's 5,200-bbl. per day combination plant at Edmonton is well integrated. Certain process steps share common pieces of equipment. In many cases, oil streams flow hot from one step to the next without passing through coolers or intermediate storage. At several points there is heat exchange between streams in different process stages. Substantial savings in initial investment and operating costs have been effected by these operations.

Why the Petroleum Industry Prefers HARTZELL Cooling Tower Fans

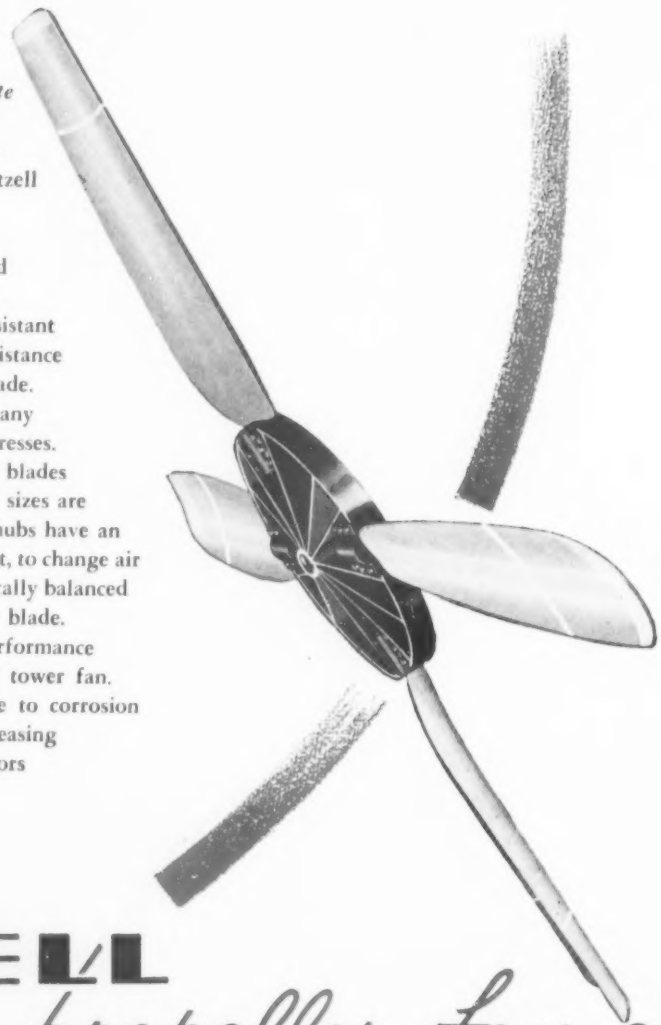
Nearly every Hartzell cooling tower fan installed since the introduction of the Hartzite plastic blade in 1941 is still in service. This proven dependability explains why the plant which has had experience with one Hartzell fan will almost invariably insist on more Hartzells as other fans need replacement.

Fabric-base Hartzite plastic was developed especially to meet the rugged requirements of the petroleum industry. It is unusually resistant to corrosion and abrasion. Durability and resistance to corrosion are constant throughout the blade. Hartzite absorbs vibration. Its strength is many times that necessary to withstand normal stresses.

Hartzell cooling tower fans with Hartzite blades are available in sizes from 10' to 22'. Smaller sizes are made of aluminum alloy. The welded steel hubs have an extremely high safety factor. Blade adjustment, to change air delivery, is easily made. All hubs are dynamically balanced and all blades are balanced against a master blade.

You no longer have to rely on claims. Performance has proven that Hartzell makes *the* cooling tower fan. Recognition of Hartzell's superior resistance to corrosion and mechanical damage is found in the increasing frequency with which cooling tower operators specify simply "Hartzell fan."

Send for Bulletin 1503.



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Save 3 ways

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Strongest V belt made

All of the load-carrying cords in grommet belts are concentrated in twin grommets. These grommets are cord loops, made like giant twisted cables except that they're endless. Since there are no center cords, the grommet belt is more flexible, and so can "give" temporarily and absorb shock loads. As a result, grommet belts last 20 to 50% longer, depending on the service. (The more severe the service, the greater the increase over ordinary belts.)

No weak spots

The section where cords overlap is the weak spot in ordinary belts. That's where 80% of V belt failures occur. But in grommet V belts this cause of belt failure has been eliminated. The grommets are endless. There are no splices or overlaps—no weak spots to cause premature belt failures.

⅓ more grip

Grommet V belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip sheaves better. Size for size, grommet belts give ⅓ more gripping power with less slip, pull heavier loads with a higher safety factor. And because there is less slip, there is also less surface wear.

Less stretch

In ordinary belts under tension, the center cords loaf, the outer cords overwork because tension is greater near the driving faces. Grommet belts, with no center cords, have much more strength and less stretch. Grommet belts stretch, on an average, only about ⅓ as much as ordinary belts.

They cost no more

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Send for proof today

Ask your local B. F. Goodrich distributor or send the coupon for a set of reports telling users' experiences and showing actual installations where grommet V belts have outlasted all others.

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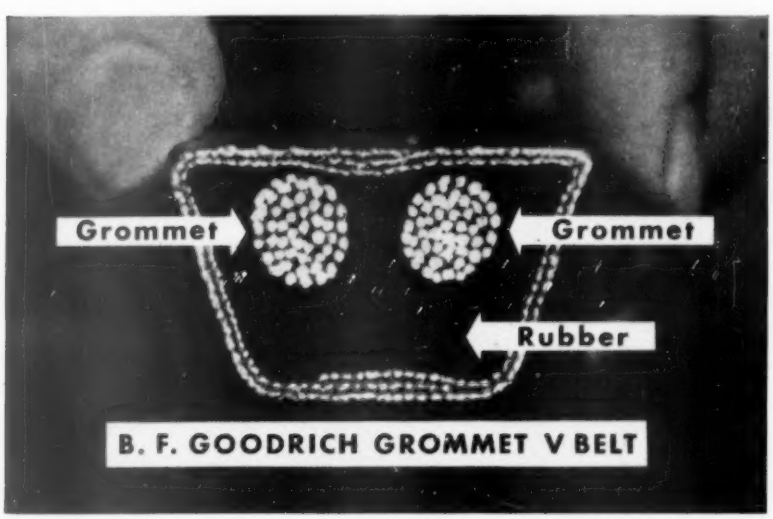

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Here's the New "Oilwell" 133-B Portable Derrick

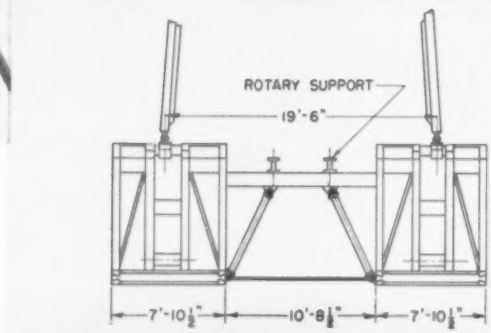
Taller, More Rigid, Greater Capacity

THIS new 133-foot portable derrick has many new and improved features over the field-proven 128-B series, such as: (1) increased height, (2) greater load capacity, (3) lower line pull in raising, (4) increased width of substructure, (5) adjustments on all four legs, (6) easier and faster means of assembly as well as (7) a variety of accessories which make it readily adaptable to various makes of draw works and drives.

The derrick is of welded tubular construction which, pound for pound, gives greater compression strength and rigidity than any other type of construction.

Pipe racking capacity with full-hole tool joints is—

12,200 ft.	3½" pipe
11,700 ft.	4½" pipe
10,980 ft.	5" pipe



LARGER FLOOR SPACE—floor space between legs, 19' 6" x 14' 0½". Window opening front side, 98' 7".

Reduced raising load—An improved stringing method for the raising lines utilizes the increased block travel to reduce line pull in raising this taller derrick.

Fast, easy assembly—The derrick is completely assembled at ground level and does not require lifting to the floor level. In fact, only one light gin-pole truck is needed in assembling the sections.

Greater safety in raising—During the raising operation, the center of gravity never passes over the pivot point as the pivot point is shifted from front to rear legs at approximately 23° from vertical. This eliminates the need to snub the derrick into the final position.

Other advantages—(1) Sealed tubular seamless steel construction, (2) easy-to-handle sections joined by tight-fitting, dowel-pin flanges, (3) six-sheave, center-pin crown block which distributes weight evenly to all four legs, (4) adjustment facilities for aligning center line of block with center line of well, (5) adjustable pipe rack with positive locking safety fingers, (6) gin poles which form draw works and engine-drive cover frame, (7) fast line from draw works running inside the derrick with traveling block in view at all times and (8) deadline held down by special anchor.

Ask . . . your nearest "Oilwell" Representative for complete information on the 133-B Portable Derrick.

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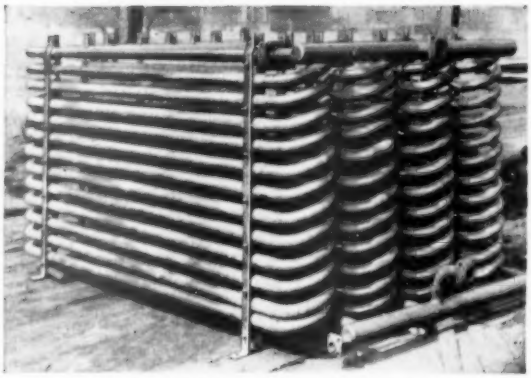

2-in. ammonia cooling coils with welded headers and ammonia flanges.

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Although seamless carbon steel pipe is most popular, Crane has the experience—and the equipment to produce pipe coils in wrought iron, copper, brass, nickel, aluminum, 18-8 of various types, and miscellaneous alloys. At your service are the finest facilities for heat-treating, stress-relieving and testing of all kinds. Crane can also supply those necessary piping accessories to give your design the added value of consistent quality throughout.

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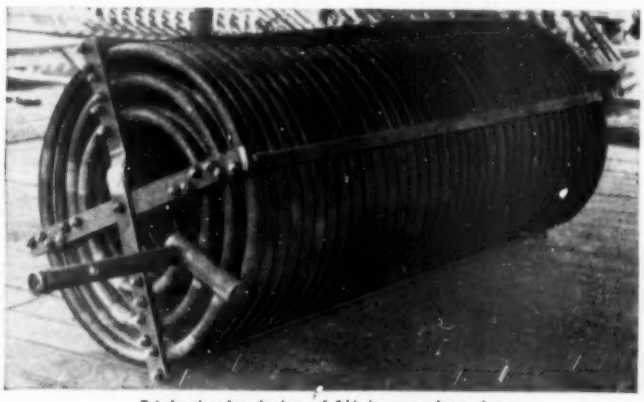
Gives Valuable Design and Specification Data

Dimensions, materials, end connections, pipe data, helpful engineering information—you'll find it all in this factual, easy-to-read handbook, free to pipe coil designers and users. Drop a card to Crane at the address below for your copy (Circular 318).



Triple circular design of 1½-in. seamless pipe.

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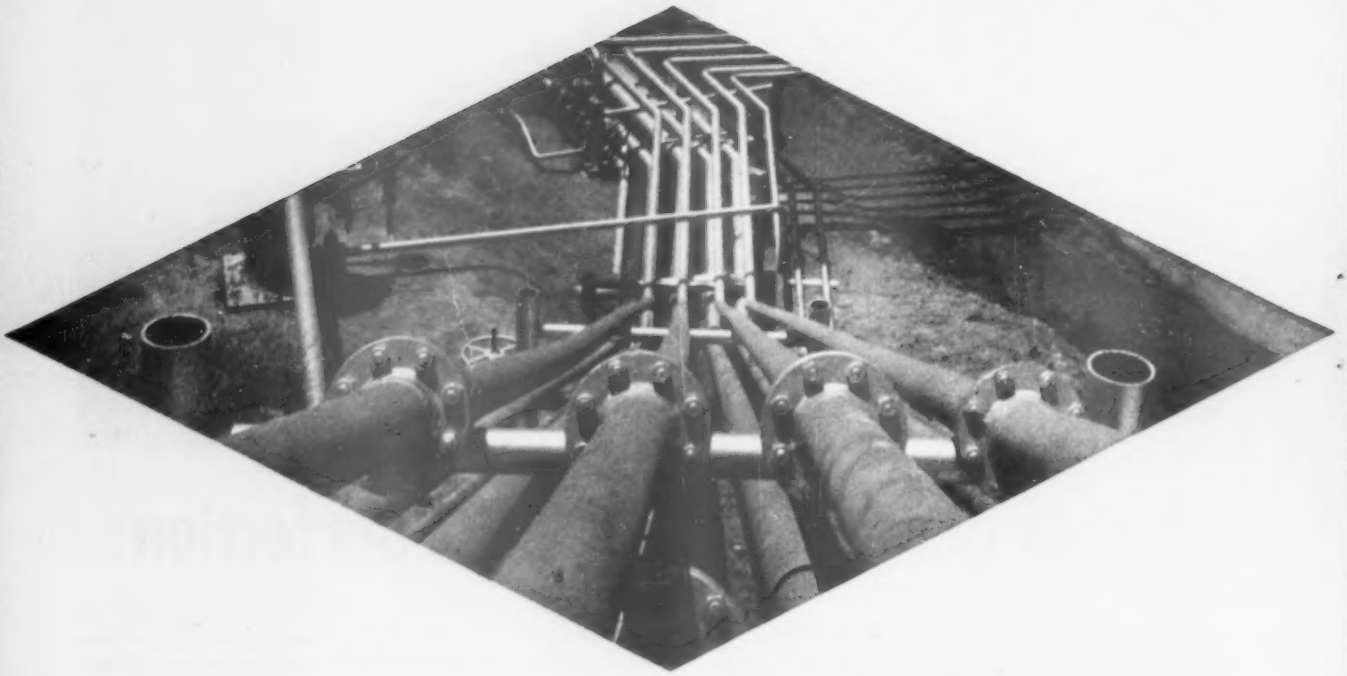

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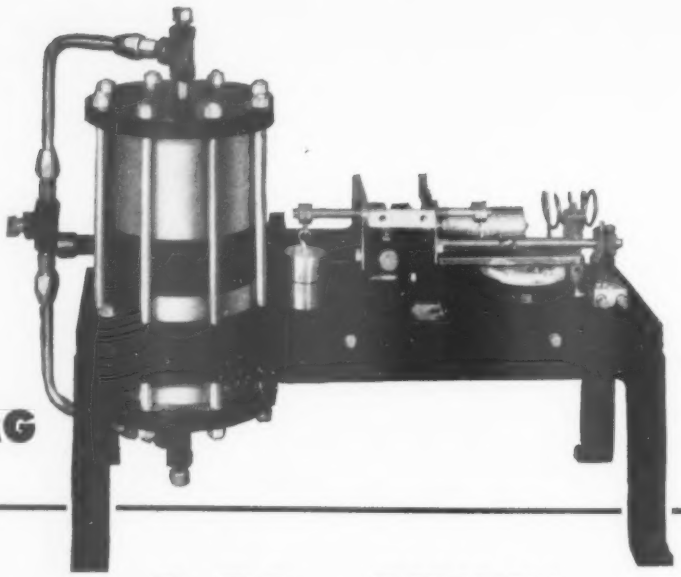

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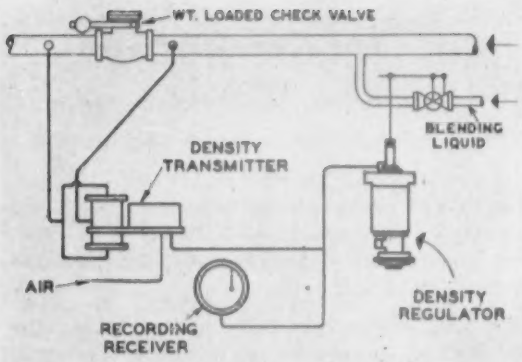

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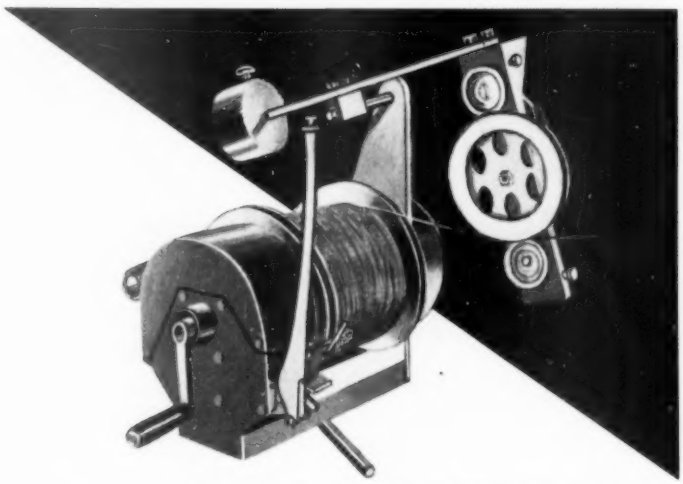

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- **Running instruments to obtain bottom hole temperature, pressures, and fluid samples.**
- **Running crooked hole surveys.**
- **Off-shore surveys that require exact linear measurements.**
- **Running mechanically-operated paraffin cutting tools.**
- **Running bridge plugs, drillable squeeze packers, and other tools in casing or open holes.**

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Phone your nearby Halliburton representative for additional facts on how these important tools can serve you. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

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Volcano, Superior and Gulf States All Steel Gas Burners for OIL COUNTRY BOILERS.

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Houston, Texas
Stand lifts, holds, tilts 55 gal. barrels. Prevents spillage—easily loaded.

WHEELING MACHINE PRODUCTS CO.
Wheeling, West Virginia
XL Steel Pipe Couplings for OIL COUNTRY TUBULAR PRODUCTS.

Performs better
in every use because
It meets Rigid Specifications

HOW are you coating your next pipeline? Over the ditch? In the mill? In a yard or as a reconditioning job? Whatever the method, be sure to use an enamel that's *formulated to specifications* . . . and guaranteed by close laboratory and production control to meet them.

Pitt Chem Modified Enamel is just such a coating—an all-weather, all-year enamel that withstands atmospheric temperatures as low as 0°F without cracking. Underground it provides optimum protection against soil conditions and elevated service temperatures.

When you use Pitt Chem Modified, you can rely on better, faster coating above ground and longer-lasting protection below ground . . . because every drum meets specifications. Write today for data sheets . . . or any other help you need to improve your pipeline protection.

Standard Grade Tar Base Enamel
Modified Grade Tar Base Enamel
Plasticized Grade Tar Base Enamel
Cold Applied Tar Base Coatings

PROTECTIVE COATINGS DIVISION
PITTSBURGH
COKE & CHEMICAL CO.
Grant Building • Pittsburgh 19, Pa.

W & D 4647

COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Clear track for line pipe men

You can plan your construction time-table with confidence when you specify Kaiser Steel line pipe, because you are assured of *on-time delivery*.

This unfailing dependability is possible because Kaiser Steel is an integrated operation and every phase of production is geared to meet your schedules without delay. This has been proved time and again on major pipe line projects.

Add to this Kaiser Steel's *uniform quality* and *wide range of sizes* and it's clear why—

It's good business to do business with

Kaiser Steel

KAISER STEEL PIPE SPECIFICATIONS • All pipe manufactured to latest A.S.T.M. and A.P.I. specifications

Type	Diameter	Length	Wall Thickness	Shipping Point
Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	14" to 18" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅝" to 12¾" O.D.	Up to 55'	.188" to .375"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	20" to 30" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser

Prompt, dependable delivery at competitive prices • KAISER STEEL CORPORATION Los Angeles, Oakland, Seattle, Portland, Houston, Tulsa, New York

22,000 hrs. of service without repair!

KENNETH FORKER
CRANE SERVICE - MARL - BULLDOZING
ALBION, INDIANA
PHONE 3304

November 21, 1952

The Pierce Governor Company, Inc.
Anderson, Indiana

Attention: Mr. Thos. L. Marks

Dear Sir:

I have a Pierce governor on an industrial power unit in an Osgood crane. I bought the crane in January 1946, and it has been in continual use since that time. It has an hour meter which registers 22,000 hours. Figuring 40 miles per hour this governor would have 880,000 miles giving complete service without repairs.

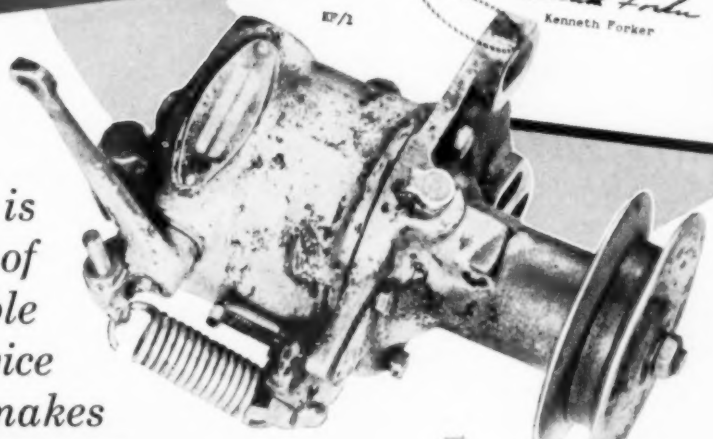
I believe this is very good service and certainly speaks a good word for the Pierce governors.

Just wanted you to know how satisfied I am with your governor.

Very truly yours,

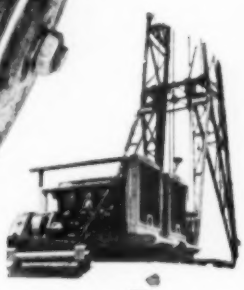
Kenneth Forker

KF/1



...this is the kind of dependable service that makes

PIERCE GOVERNORS preferred!



Mr. Forker's Pierce Governor worked the equivalent of 12-hour days for six straight years without the first sign of trouble or wear.

When you buy Pierce-governed power equipment you are assured of unsurpassed governor performance and trouble-free service . . . usually for the life of your engine. That's why Pierce is preferred.

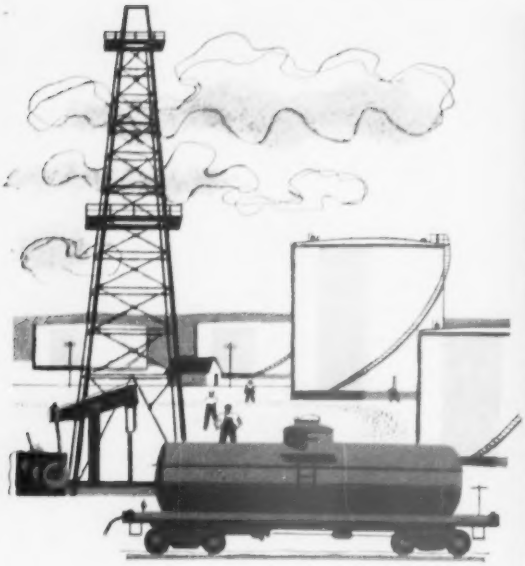
There's a Pierce Centrifugal Governor for gas, gasoline and diesel engines in every industrial use. Write for specific information.

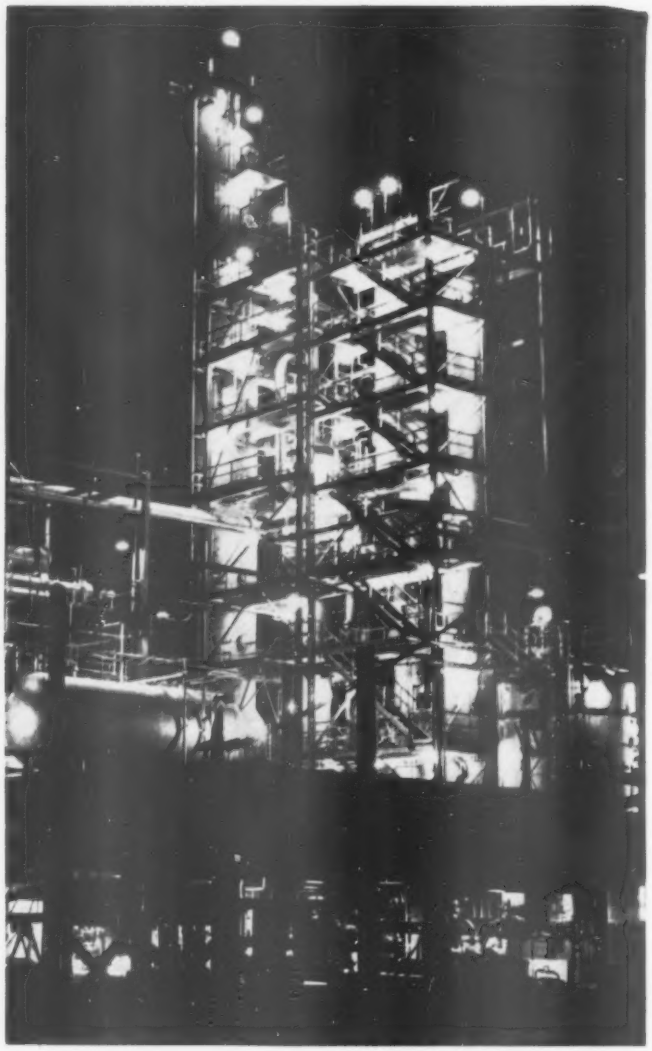
THE PIERCE GOVERNOR CO., INC.

1620 Ohio Avenue, Anderson, Indiana

PIERCE — THE MARK OF QUALITY

IF your present governor is giving you trouble, tell us about it. Chances are we can supply you with a replacement that will solve your problem fully.





Quaker Oats Furfural as a *selective solvent*

As a selective solvent furfural is producing high quality lube oils from a variety of crude stocks. The numerous installations here and abroad demonstrate the advantages of the operation, both technical and economic. Process information, engineering data, and test results on various oils are available from the licensor of the process.

Here are some facts about furfural itself useful in evaluating the solvent we supply.

Photograph by John Trauger—"The Sahioan."

1. SAFETY—Furfural is relatively non-toxic, hence introduces no unusual health hazard.

2. EASE OF HANDLING—Furfural flows readily at below zero temperature (freezing point —34° F.). Its high boiling point (323° F.) permits convenient storage at atmospheric pressure and easy handling.

3. STABILITY—Furfural has extremely good heat stability (see Ind. Eng. Chem. *32*, 1639 (1940)). This stability is emphasized by low operating losses in commercial units all over the world.

4. SUPPLY—Furfural is produced from the non-food and non-fiber portions of agricultural residues, such as corn cobs, the supply of which is renewable annually.

5. ECONOMY—Losses in furfural processing units are low; the cost of the solvent is modest.

6. DENSITY—A high density (1.160 at 68° F.) plus low surface tension (49 dynes/cm. at 68° F.) permits rapid phase separation.

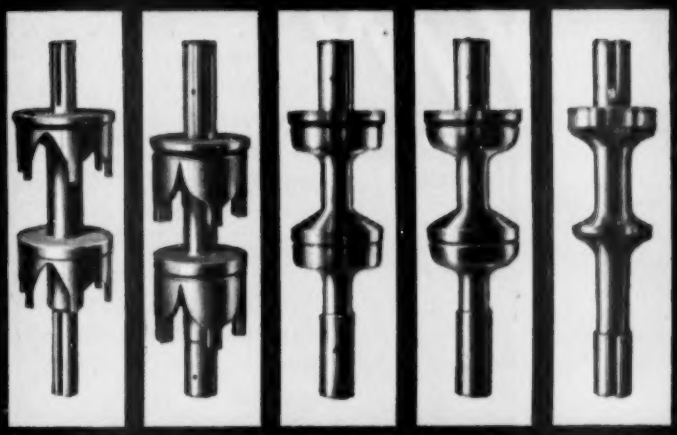
Quaker Oats Bulletin 203—"Physical Data on Furfural"—contains comprehensive data, tables and curves on the physical characteristics of furfural. Obtain a copy from the nearest office listed below.

The Quaker Oats Company CHEMICALS DEPT.

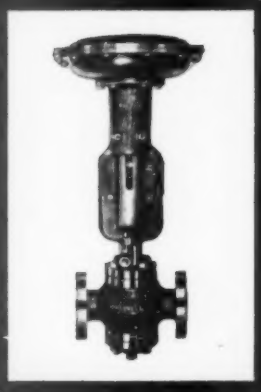
339H The Merchandise Mart, Chicago 54, Illinois
Room 539H, 120 Wall St., New York 5, N. Y.
Room 439H, P. O. Box 4376, Portland 8, Oregon

In San Francisco: The Griffin Chemical Company • In the United Kingdom: Imperial Chemical Industries, Ltd., Billingham, England
In Europe: Quaker Oats-Graanprodukten N. V., Rotterdam, The Netherlands; Quaker Oats (France) S. A., 3, Rue Fillet-Will, Paris IX, France
In Australia: Swift & Company, Pty., Ltd., Sydney • In Japan: F. Kanematsu & Company, Ltd., Tokyo

WIDE SELECTION . . .



for any valve application



Discs for the Honeywell Series 700 Valve include single and double-seated V-ported and contoured types, each with either linear or equal-percentage characteristics, plus a flat disc for on-off control . . . all ground and polished . . . all designed to retain characteristics under severe service. The Honeywell Series 700 Valve comes in a full range of styles and sizes . . . has *all* the features you look for in a fine valve. Write today for your copy of Bulletin 700-2. MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 1906 Windrim Avenue, Philadelphia 44, Pa.

MINNEAPOLIS
Honeywell
VALVE PRODUCTS

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HONEYWELL

First in Controls

ANOTHER *Electric Power* CASE HISTORY

HYDRAULIC UNIT USES Low Cost Purchased

Electric Power

This is one out of hundreds of wells on the plains of the famous Texas Panhandle, being pumped by dependable, economical, Purchased *Electric Power*. Controlled automatically, this long stroke hydraulic pump utilizes a 40 HP electric motor to lift oil from 6,000 feet. Throughout this area—and in practically every other oil producing area—Low Cost *Purchased Electric Power* is on the job supplying better performance.

For full details on Electric Power, call your nearest Electric Power Company . . . TODAY . . . then make it "PEP . . . in '53.

*PEP—Purchased Electric Power

North, South, East or West the switch is to ***PEP in '53**

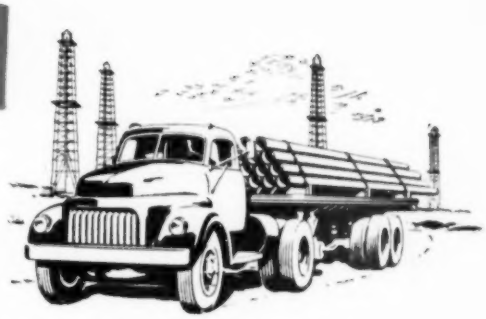
ORGANIZED IN THE INTEREST OF GREATER SERVICE TO THE PETROLEUM INDUSTRY

Our 25th Year

Petroleum Electric Power Association

CALL YOUR NEAREST ELECTRIC SERVICE COMPANY FOR MORE FACTS OR ADDRESS YOUR REQUEST TO P. O. BOX 2271, DALLAS, TEXAS

Eaton 2-Speed Axle Trucks cost less to run, less for upkeep,



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and last longer

Eaton 2-Speed Axles make available *twice* the conventional number of gear ratios, permit engines to run in their most efficient and economical range at all times, reducing stress and wear on vital parts. Eaton's exclusive planetary design, forced feed lubrication, and extra rugged construction cut maintenance cost. Ask your dealer why—working or trading—Eaton 2-Speeds make your trucks worth more.

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PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

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CAN be stopped by *Harco*

Pioneer in Cathodic Protection, **HARCO** is equipped to satisfy any and all requirements of protecting underground pipelines from the menace of corrosion.

HARCO COMPLETE JOB-ENGINEERED SYSTEMS provide for every factor affecting your underground piping. Services include all necessary testing, drawings, materials and installations, as well as maintenance.

INSTALLATION CONTRACTING is completed to customers specifications and is supervised by experienced **HARCO** personnel. An installation contract can cover as much or as little of the total job as required.

MATERIAL AND SUPPLIES available from **HARCO** include the famous **HARCO** air-cooled and totally oil-immersed rectifiers, built to specific job needs — G-E rectifiers — graphite, treated-graphite and magnesium anodes — Polyken polyethylene tape — Cadwell Connections for cathodic protection systems — M. C. Miller meters and copper sulphate electrodes for testing — and other supplies necessary for cathodic installations.

Write today for catalog or call MOntrose 2-2080

CONTACT HARCO FOR ALL YOUR CATHODIC PROTECTION NEEDS.

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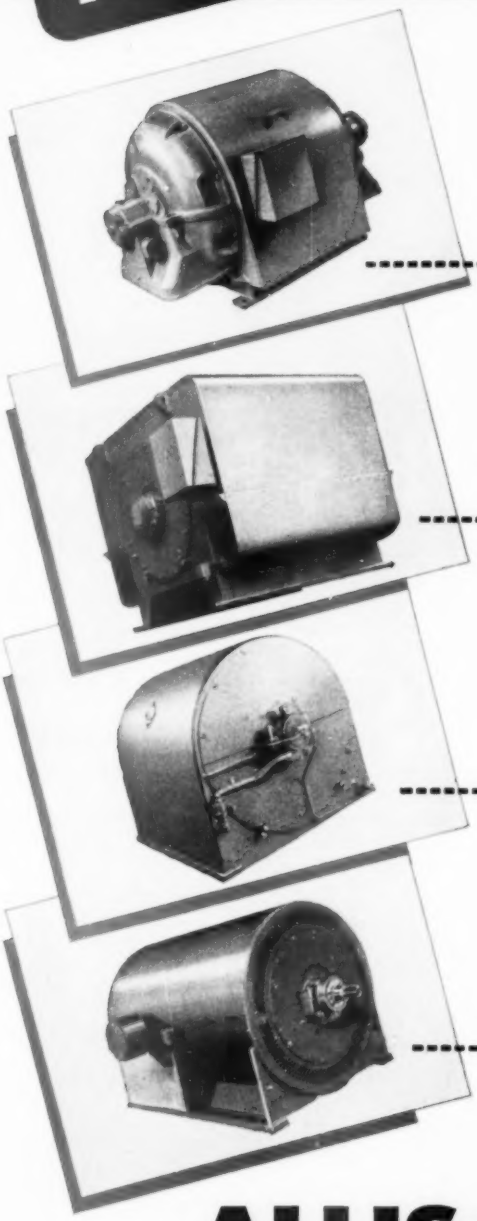
Get the Motor You Need

ALLIS-CHALMERS
Large Induction MOTORS

Because Allis-Chalmers builds a complete line of induction motors for the petroleum industry, you can select the exact degree of protection needed



Drip-Proof or Splash-Proof

In many cases, drip-proof or splash-proof motors can readily be used for refinery power-plant auxiliaries, crude oil pumping, and similar applications. Designs based on half a century of motor building experience assure dependability and durability. For detailed information, ask for Bulletins 05B7542 and 51B7693; for two-pole motors 900 hp and larger, get Bulletin 05B7550.

Weather-Protected

Wherever open ventilation is permissible, weather-protected motors can be used. And they can be used outdoors in any kind of weather — rain, snow, sleet, or blowing dust and sand. Special tests with sand and water driven at 75 mph proved that these motors need no housing. Yet they cost little more than indoor splash-proof machines. Ask for Bulletin 05R7874.

Enclosed Forced-Ventilated

Here's a design developed especially for pipeline-station pump and compressor drives. Protection for these hazardous locations is provided by supplying the ventilating air under pressure. The motors cost little more than open designs, and enclosed design minimizes maintenance. Construction of basic motor components is the same as in standard open machines.

Totally-Enclosed Fan-Cooled

For maximum motor protection, specify Allis-Chalmers *tube-type* TEFC or explosion-proof motors. They offer complete enclosure of electrical parts, self-cleaning action and full internal air circulation. Time-proved design permits ratings up to 3000 hp and larger. Underwriters' labels up to 800 hp at 3600 rpm. Ratings and construction details are given in Bulletins 51B7149 and 05B7150.

For more information or for engineering assistance, call in your nearby A-C representative. Or write for the descriptive bulletins listed above. Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-4063

Friendly, personal know-how is traditional with the Republic Staff . . . another reason why oil men in every oil-producing area in America refer to Republic as "The Oil Bank."

Capital and Surplus $50,000,000.00
Largest in the South

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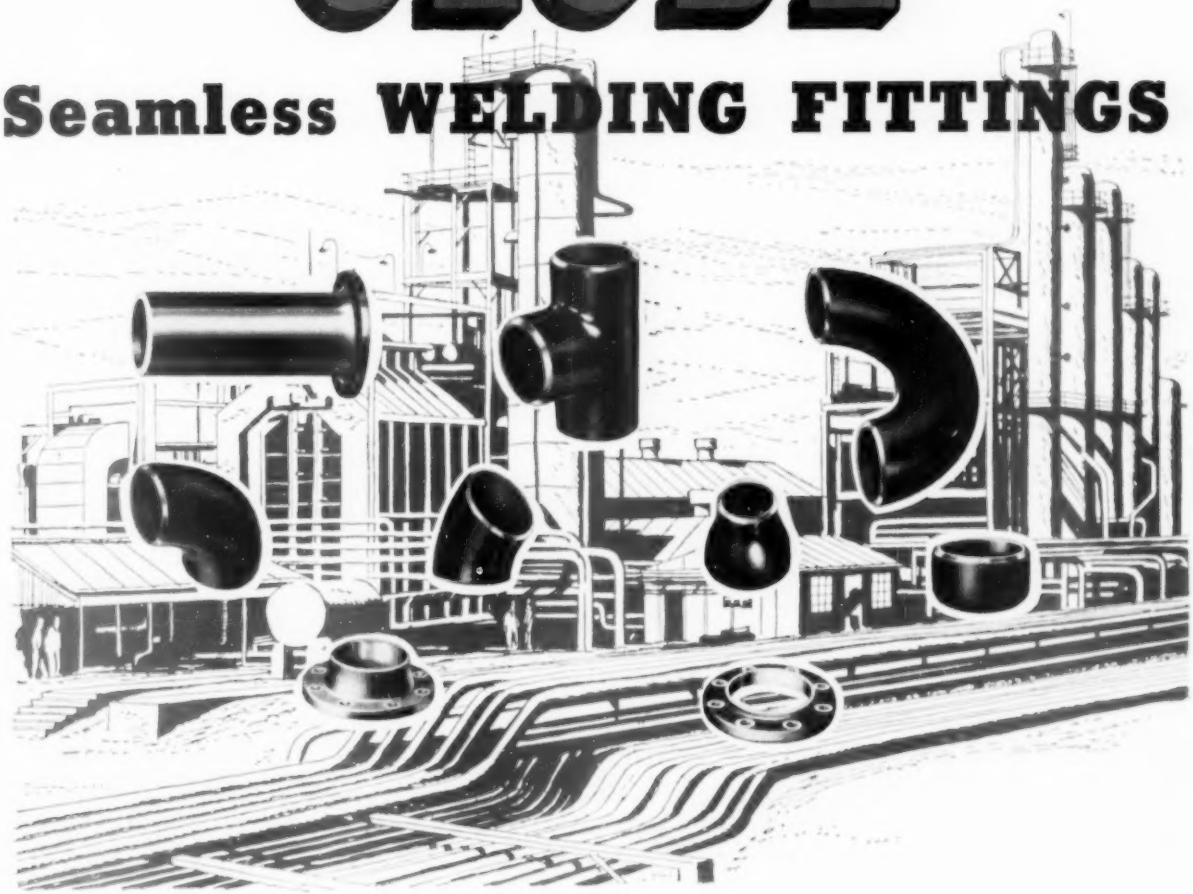
GLOBE

Seamless WELDING FITTINGS



The only seamless welding fittings precision-processed . . . from billet . . . to tube . . . to fitting

From charging the specially designed revolving furnace with a steel billet (above) through the many succeeding steps of production, every Globe process is specialized to produce fittings of unvarying quality.

Globe precision-process manufacture begins with the billet —continues through the making of the seamless steel tube (Globe alone among welding fittings manufacturers produces seamless steel tubes)—and extends through to the production of the finished fittings.

Because Globe has highly specialized controls—at every stage of manufacture at its own plant—you can be sure of uniform high quality seamless welding fittings when you specify Globe.

Send for the Globe Welding Fittings complete catalog.

GLOBE STEEL TUBES CO.,
Milwaukee 46, Wisconsin

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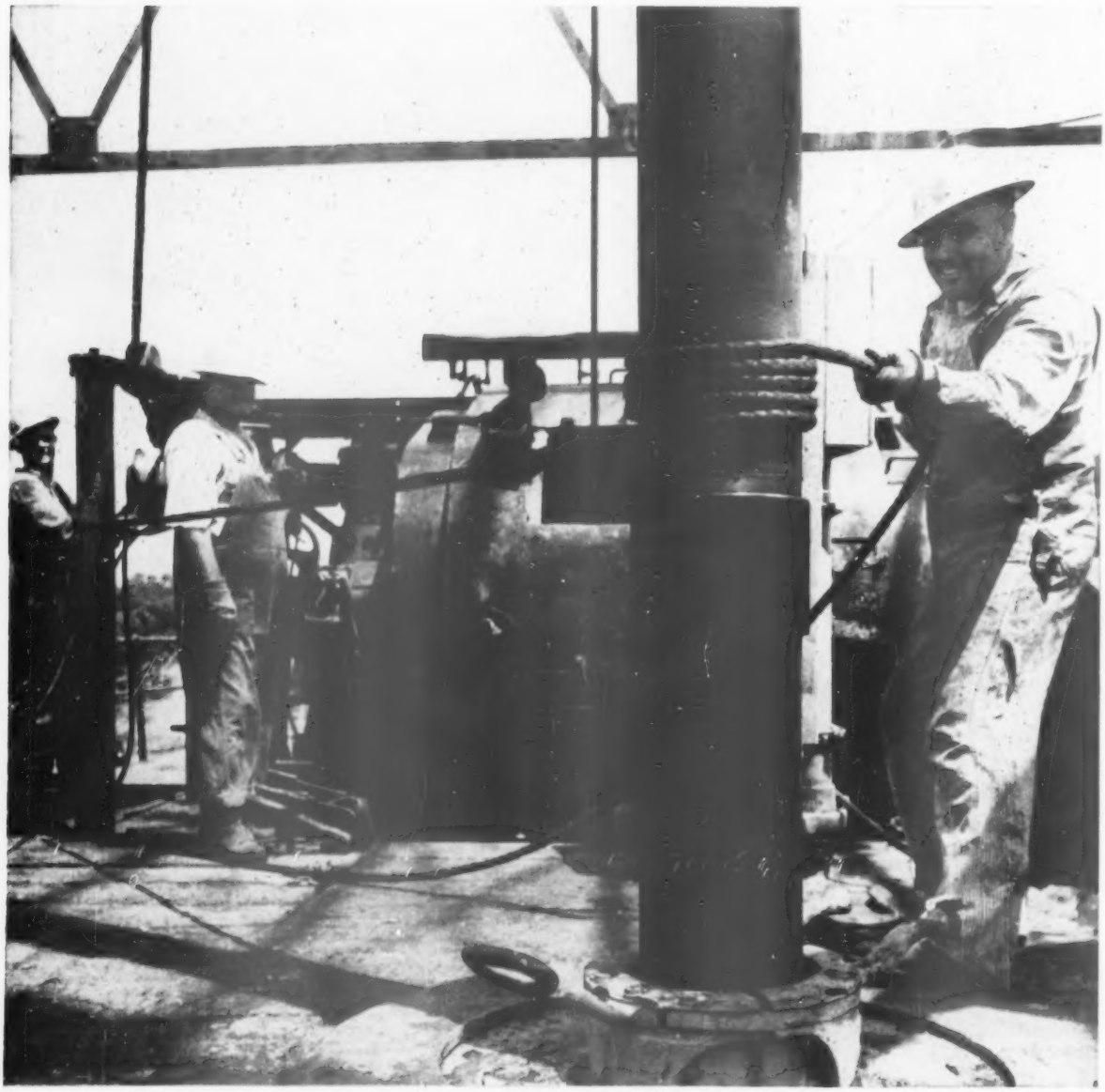
Producers of Globe Welding Fittings — Globe seamless stainless steel tubes — alloy-carbon seamless steel tubes — Gloweld welded stainless steel tubes — Globeiron (high purity ingot iron) seamless tubes.

AVAILABLE IN A COMPLETE LINE OF SIZES AND WEIGHTS THROUGH GLOBE DISTRIBUTORS IN ALL KEY CITIES

Electric Weld...or Seamless Casing and Tubing...

TAKE YOUR CHOICE



REPUBLIC NOW MAKES BOTH!

1. Clean, full-formed threads and uniform roundness that make for fast stabbing, spinning and tonging.

2. Strong, tight joints with a uniform amount of steel under thread roots to resist pull-out at joints.

3. High ductility steel, full-normalized for uniform structure, cold-sized for high yield strength—combining to produce high resistance to collapse.

That, briefly, has been the story of Republic Oil Country Tubular Goods—Electric Weld Casing and Tubing—a story verified by millions of feet run in deep and shallow wells in every field.

Now, the story has a new chapter—added by a complete, new Republic Seamless Tube Mill at Chicago, Illinois.

From now on, you can have both Republic Electric Resistance Weld and Republic Seamless Casing and Tubing—to meet your increased demand for oil country tubular goods.

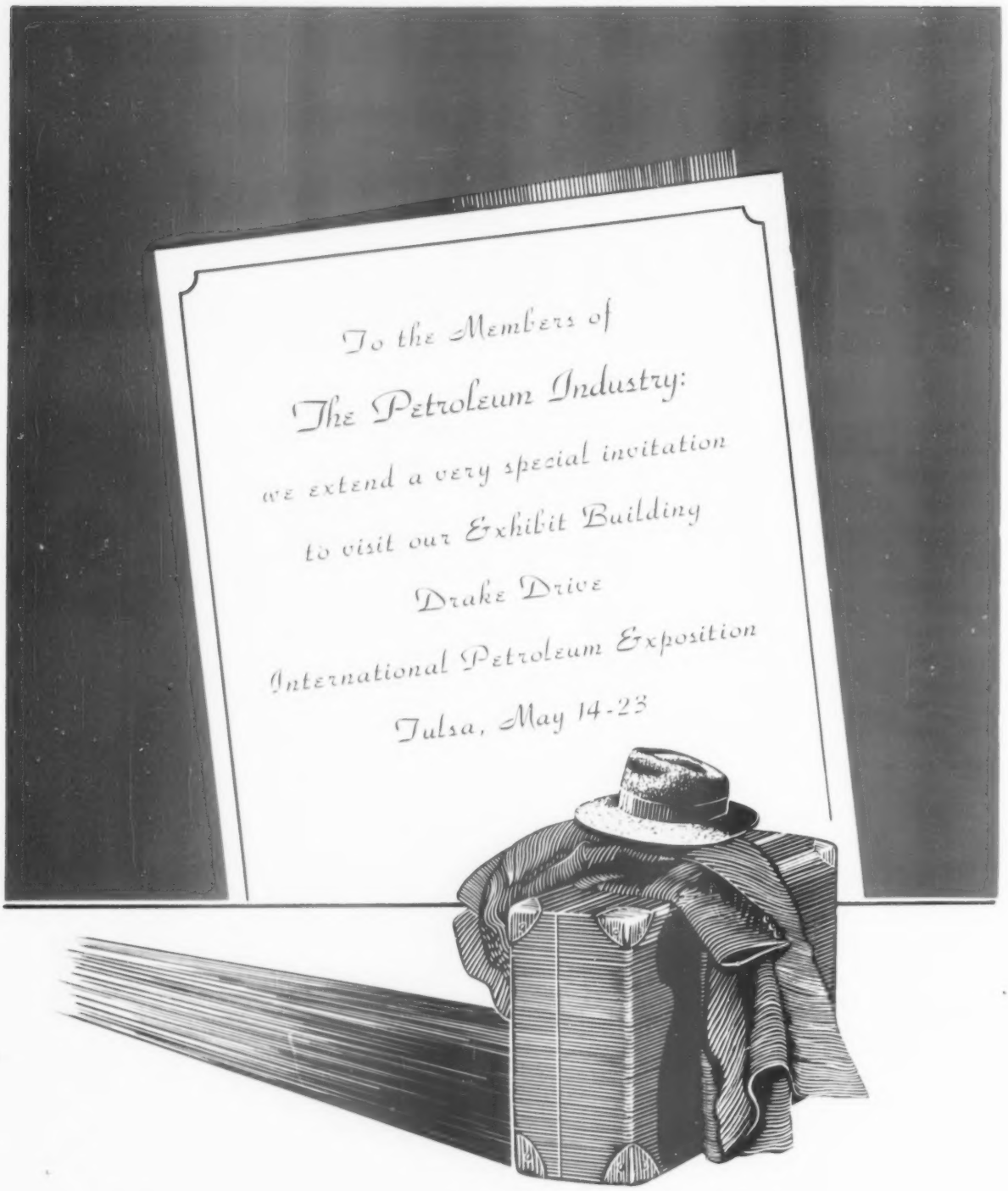
Contact your nearest Republic Sales Office —or write us.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Make a note of these sizes: Electric Weld Casing and Tubing in sizes 2⅜" to 13⅜", grades H-40 and J-55. Seamless Casing and Tubing in sizes 2⅜" to 9⅝", through grade N-80.

Republic
REPUBLIC STEEL
CASING AND TUBING
Electric Weld and Seamless

Other Republic Products include Line Pipe—Carbon, Alloy and Stainless Steels—Upson Studs, Bolts and Nuts—Electrunite Heat Exchanger Tubes



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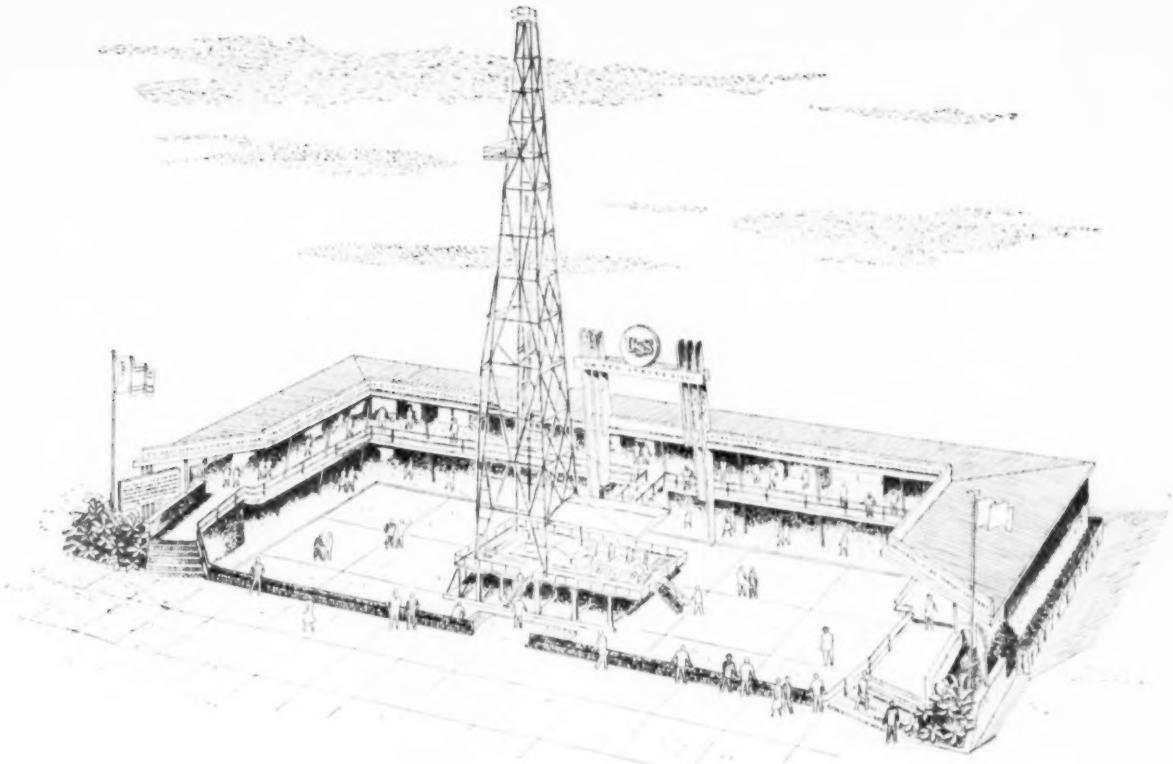
88 STORES • 19 OFFICES • 9 RESIDENT SALESMEN
EXPORT: 405 Lexington Ave., New York, N. Y., U. S. A.



At the International Petroleum Exposition

There's plenty to see at the New U.S. Steel Building!

- A Complete Operating Drilling Rig With 133-Foot-High Derrick
- "T" Steel—A New Super-Strong, Super-Tough Alloy Steel
- The Industry's Most Powerful Slush Pump
- The Giant Pipes Used In Today's Pipelines
- Dozens Of Operating Exhibits

We've a lot to show you at the United States Steel Building when you visit the International Petroleum Exposition in Tulsa. Sheathed in U·S·S Stainless Steel, this brand-new building is a giant showcase for the exhibits of United States Steel and its Divisions and Subsidiary Companies. The unique building is so designed that you can see most everything from wherever you happen to be standing.

We'll be on hand to extend a cordial welcome . . . explain the exhibits in detail . . . answer any questions you may have about the thousands of U. S. Steel products which serve the Oil Industry.

On Sunday, May 17. The Theatre Guild on the Air, famous radio program sponsored by United States Steel, will pay tribute to the International Petroleum Exposition, with part of the broadcast originating from Tulsa. National Broadcasting Company, coast-to-coast network. Consult your newspaper for time and station.

United States Steel Corporation · Oil Well Supply Division · American Steel & Wire Division · National Tube Division · Consolidated Western Steel Division
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USS

UNITED STATES STEEL

Catforming combines these 4 advantages

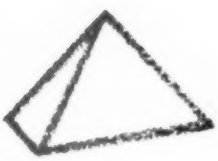
The Atlantic Catalytic Reforming Process brings you:

1. high yield

The Atlantic Catforming Process was specially designed to produce high octanes at high yields. It properly balances all the many reactions necessary for the production of high octanes, assuring you of a high yield-octane relationship and maximum liquid recovery of high octane products from any feed stock.

2. low cost

Catforming units can be designed by *your own* contractor, thus providing important economies and greater simplicity. Commercial units of from 750 to 12,000 BPD charge capacity are now being built at investment costs of only $250 to $400 per barrel. In operation, no feed preparation, product finishing or costly regeneration facilities are needed.



3. stability

The catalyst in the Atlantic Catforming Process retains reforming activity for extensive periods, and at the same time has no loss in selectivity. Even under the varied conditions encountered in normal refining operations, catalyst life is from 35 to 100 barrels per pound.

4. ruggedness

Activity and selectivity of the Catforming catalyst are virtually unaffected by water, sulphur compounds, and nitrogen compounds normally encountered in naphtha reforming. Atlantic's catalyst has *proved* its ability to resist physical and chemical change.

FOR COMPLETE DETAILS call or write The Atlantic Refining Company, Research and Development Dept., P. O. Box 8138, Philadelphia 1, Pa. (Telephone, Howard 5-2345.)

It's the catalyst that counts

ATLANTIC

Get the BEST SERVICE

For your Marquette HYDRAULIC GOVERNORS

At our factory you can get the right kind
of service for your Marquette Governors.
Our trained personnel are skilled in reconditioning,
testing and adjusting Marquette Governors—
carefully . . . expertly . . . intelligently.
We use factory equipment to do the work thoroughly
and speedily, assuring accurate governor performance
at economical costs. May we serve you?

Factory: 1145 Galewood Drive, Cleveland, Ohio
West Coast Governor Station: 4512 San Pablo Avenue, Emeryville, Cal.

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METAL PRODUCTS CO.
CLEVELAND 10, OHIO
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ROLLER BEARING TEXTILE SPINDLES
WINDSHIELD WIPERS FOR AIRCRAFT
FUEL OIL PUMPS AND INJECTORS
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ROTARY HIGH PRESSURE OIL FIELD PUMPING MACHINERY

Down time got you down?

You Need Improved

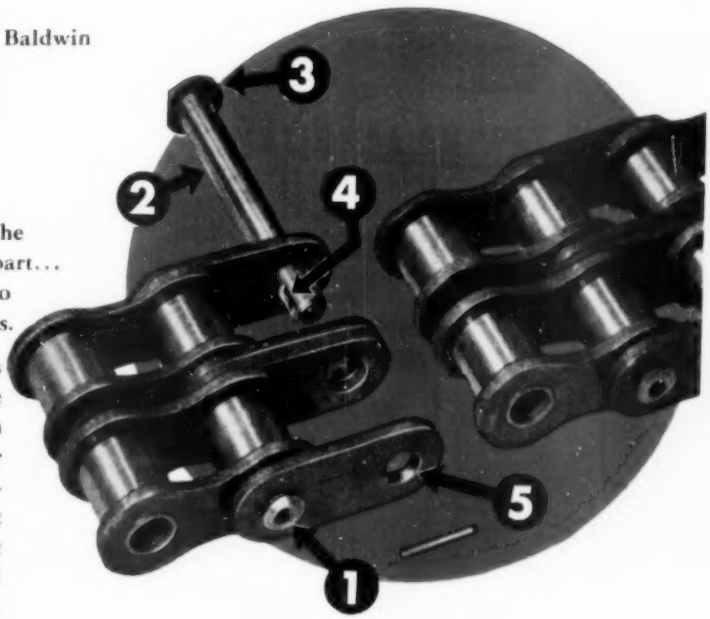
Baldwin Assembly Riveted Roller Chain!

There's no doubt about it...with Improved Baldwin Assembly Roller Chain you can drastically reduce down time...drill more feet of hole per day...make more profit per job.

Here's why...

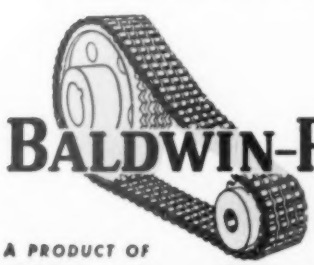
The Improved Baldwin Assembly features the *Single Pin Coupler Link*...it's easy to take apart... easy to install...easy to repair...and easy to spot because of its straight edged side plates.

One end of the single pin coupler link is firmly riveted to the adjacent link (1). The other end contains the unique Coupler Pin (2). One end of this pin is spun over a washer (3). The other end has a milled flat and locking pin (4). The Coupler Pin is an easy fit through the chain except for the milled flat end which is press fitted through the special matching hole (5) in the coupler link plate. Thus, you have to drive the pin only the length of its milled flat in coupling or uncoupling the chain.



THIS CHAIN LASTS FAR LONGER . . . . it's a riveted chain, with all the riveted advantages. No "sloppy" pin fits to cause quick wear...premature failure.

VISIT OUR BOOTH IN THE TEXAS BUILDING AT THE OIL SHOW



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A PRODUCT OF

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IT'S "MADE UP"...NOT "CUT UP"

You can *make up* Baldwin Assembly to any length chain you need. It comes boxed in 10-foot lengths with the exclusive single pin couplers installed at convenient intervals. Each box contains a chart which shows you quickly and easily which sections to use to get the exact length or number of pitches you need.

For all the facts, see your local supply store or mail the coupon for your copy of our new Oil Field Chain Bulletin 52-3. Baldwin-Rex Oil Field Sales Offices located in New York • Tulsa • Dallas Houston • Midland • Los Angeles

Chain Belt Company 52-425X
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Milwaukee 1, Wis.
Please send me Bulletin 52-3.

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Company.....

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City.....*State*.....

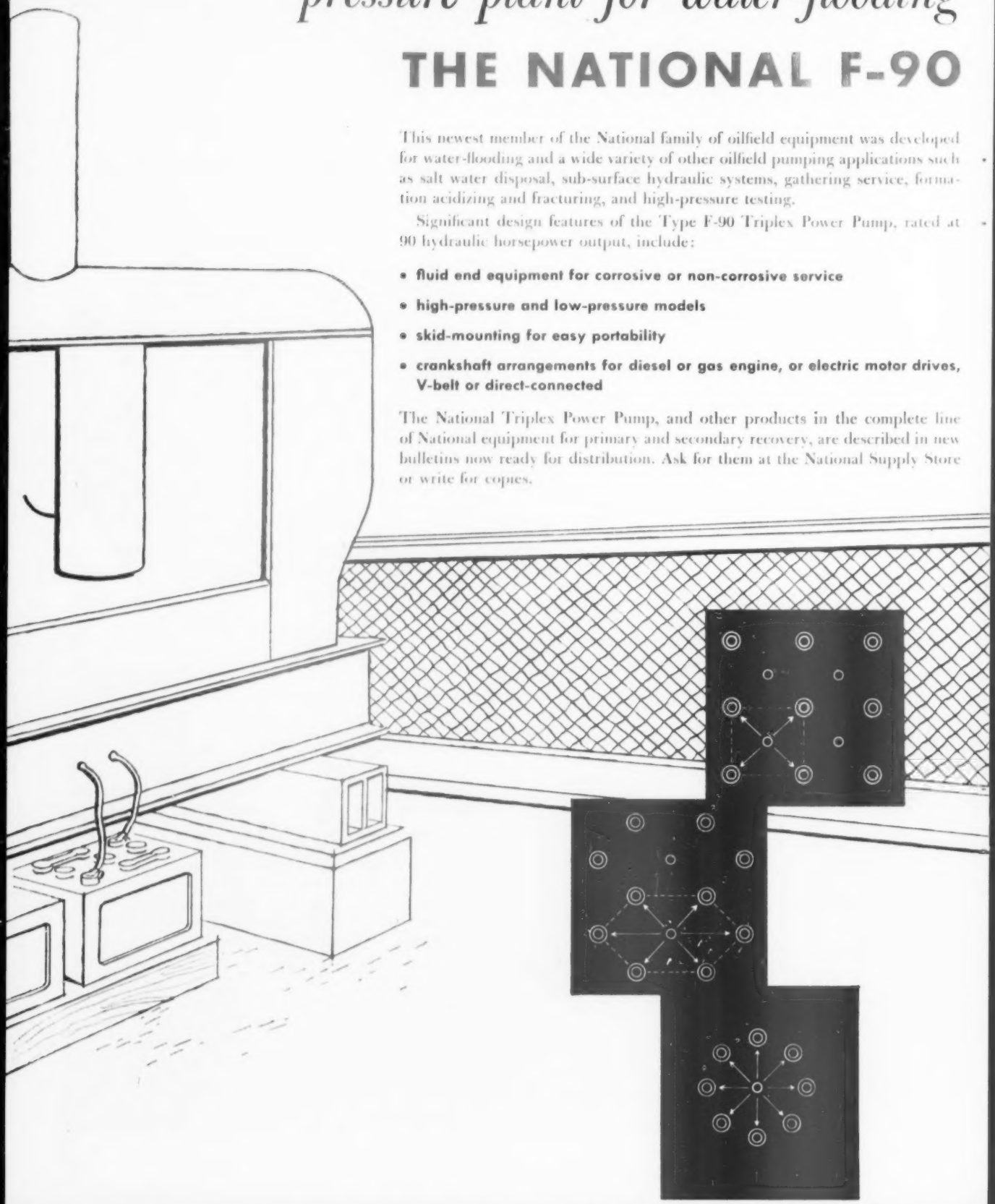
Versatile, new...
pressure plant for water-flooding
THE NATIONAL F-90

This newest member of the National family of oilfield equipment was developed for water-flooding and a wide variety of other oilfield pumping applications such as salt water disposal, sub-surface hydraulic systems, gathering service, formation acidizing and fracturing, and high-pressure testing.

Significant design features of the Type F-90 Triplex Power Pump, rated at 90 hydraulic horsepower output, include:

- **fluid end equipment for corrosive or non-corrosive service**
- **high-pressure and low-pressure models**
- **skid-mounting for easy portability**
- **crankshaft arrangements for diesel or gas engine, or electric motor drives, V-belt or direct-connected**

The National Triplex Power Pump, and other products in the complete line of National equipment for primary and secondary recovery, are described in new bulletins now ready for distribution. Ask for them at the National Supply Store or write for copies.



TRIPLEX PUMP

FEATURES AND ADVANTAGES

1. Connecting rods are equipped with steel backed babbitt lined precision bearing shells.
2. For corrosive service, either the large or small fluid end can be furnished in Ni-resist high nickel alloy cast iron.
3. Close end clearances in the fluid end plunger cavity promote best filling, improve volumetric efficiency and reduce shock and vibration on pump and manifolding.
4. Easily removed stuffing box cartridge allows the use of a standby cartridge which can be properly packed during leisure moments. Minimizes down time.
5. All packing can be easily reached for adjustment.
6. Plungers may be either steel for non-corrosive service, or vitrified high aluminum oxide compound (ceramic) for corrosive service.
7. Stainless steel valves give maximum corrosion resistance and have light moving parts, thus reducing inertia and allowing maximum fluid filling.
8. Interchangeable suction valves are removable through cylinder heads, and allow installation of valves in a single valve pot without complication of valve spacing devices . . . make possible straight through fluid flow with minimum end clearance.
9. Lower suction elements assure better suction conditions than a vertical type pump.
10. Coordinated design of suction passages, valve areas, and end clearances gives improved fluid filling and permits higher speed operations.
11. All power end bearings are pressure-lubricated. A direct-driven built-in geared pump delivers oil to crank shaft and connecting rods. Crosshead ways and intermediate rods are lubricated by a cascade system fed by crank shaft splash. A pressure gage is provided to indicate proper lubrication at all times.
12. Wide base support reduces vibration.
13. Skids can be provided for unitized portable mounting.

NATIONAL BLUE PRODUCTS

THE NATIONAL SUPPLY COMPANY

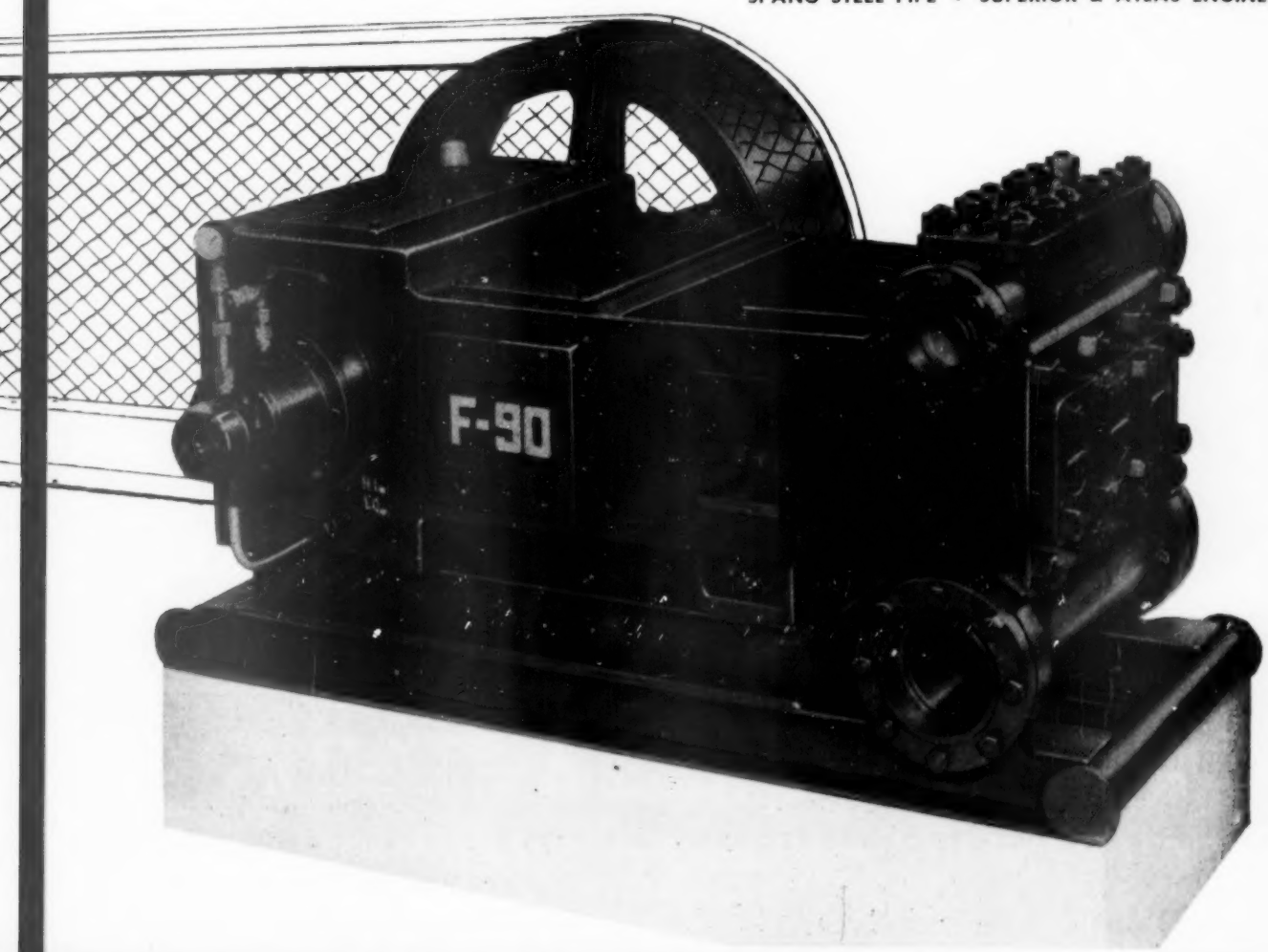
PITTSBURGH 30, PENNSYLVANIA

DIVISION OFFICES: Denver; Fort Worth; Houston; Pittsburgh; Tulsa; Torrance

CANADA: The National Supply Company, Ltd., 200 F. W. Clark Building, 709 Eighth Avenue, West, Calgary, Alberta

EXPORT: 600 Fifth Avenue, New York 20, N.Y., U.S.A.; River Plate House, 12 South Place, London E.C. 2

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT
SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES



MID-CONTINENT
Invites You to Attend

The Greatest Industrial Show on Earth

INTERNATIONAL PETROLEUM *Exposition*

TULSA
May 14-23

See MID-CONTINENT'S EXHIBIT OF OIL FIELD EQUIPMENT --- ONE OF THE LARGEST AND MOST COMPLETE DISPLAYS EVER SHOWN

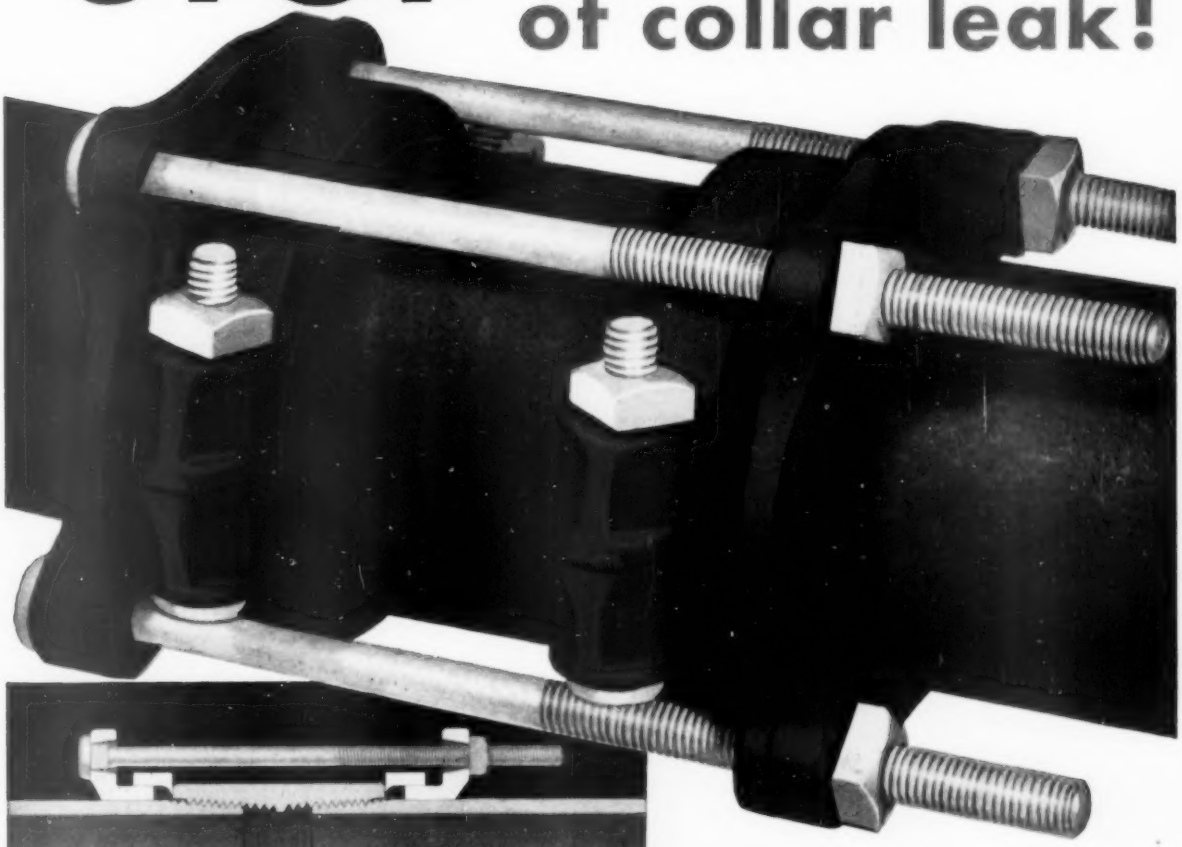
MID-CONTINENT'S
OIL SHOW LOCATION
DRAKE DRIVE
TULSA, May 14-23

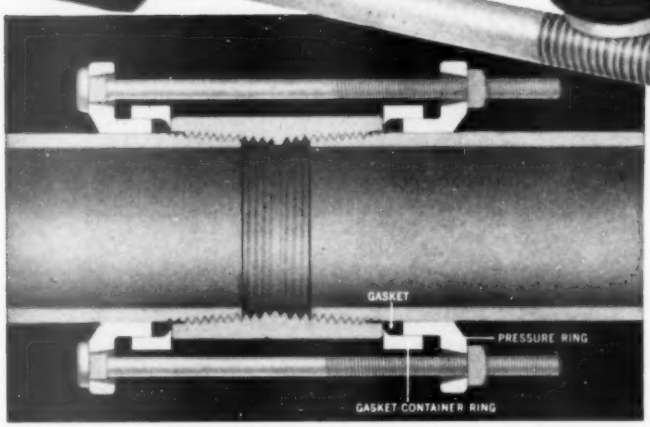
MID-CONTINENT
Supply Company

General Offices Mid-Continent Building FORT WORTH, TEXAS

THE WORLD'S LARGEST INDEPENDENT OIL FIELD SUPPLY COMPANY

STOP every type of collar leak!





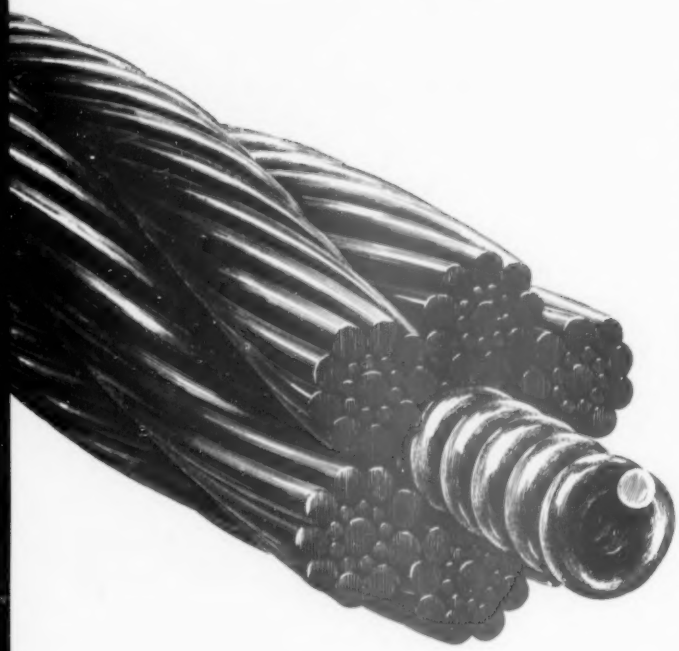
SKINNER-SEAL collar leak clamp with sealed gasket

SKINNER-SEAL Collar Leak Clamps are standard equipment with most companies, for permanent repairs on oil and gas lines. Gasket is sealed by gasket container rings — pressure is sealed in . . . air, moisture and gasket-destroying soil conditions are sealed out. The pipe, not the collar, guides the packing into the leak. Rugged pressure rings, large diameter, high tensile steel, electroplated bolts and rigid container rings make the Collar Leak Clamp *effective under any pressure*. Handy wrench enclosed in each carton of 3 clamps. Sizes 2" — 12" incl. in stock at supply stores! M. B. Skinner Co., Est. 1898, South Bend, Ind.

SKINNER-SEAL COLLAR LEAK CLAMP

Rotary Drilling Contractors...

NOW! a new



WHAT IT IS

J&L SPRING-CENTER DRILLING LINES are just what the name implies—a new type of wire rope in which the center of the rope is made of a tightly coiled high quality steel spring instead of an independent wire rope or a fiber core. The outer strands of the rope are laid up in the regular J&L rotary drilling line constructions. This exclusive new J&L Spring-Center makes possible a flexible wire rope, yet provides a strong uniform support for outside strands against all the crushing action a rotary line receives.

WHAT IT DOES

SPRING-CENTER DRILLING LINES have been designed and field tested for all rotary rigs. They have been found to provide greater flexibility and greater resistance to crushing than any other rotary line now in use.

The chart below gives you the design factors for J&L SPRING-CENTER DRILLING LINES.

SPRING-CENTER ROTARY DRILLING LINES*

HOOK LOAD (LBS.) AND DESIGN FACTOR

For Multiple Reeved Blocks (Roller Bearing Sheaves)

*Improved Plow Steel

**Includes Traveling Block Assembly

When the hook load is a RED figure, the Design Factor is low and the next higher parts of line should be strung. When operating in the RED, wire rope service will be normally reduced.

Hook Load ÷ Parts of Line = Dead Line Load

Wire Rope Diameter	4 Part Hook Load**	6 Part Hook Load**	8 Part Hook Load**	10 Part Hook Load**	12 Part Hook Load**	Design Factor
7/8"	38800	56400	72000	87000	.....	6
	46800	67200	86400	104000	.....	5
	58400	84000	108000	130000	.....	4
	77600	112800	144800	174000	.....	3
1"	50400	73200	93600	113000	.....	6
	60800	87600	112800	135000	.....	5
	76000	109800	140800	170000	.....	4
	100800	146400	187200	226000	.....	3
1 1/8"	63600	91800	118400	142000	164400	6
	76400	109800	141600	170000	198000	5
	95200	137400	176800	213000	246000	4
	127200	183600	236000	284000	328800	3
1 1/4"	78400	112800	144800	174000	192000	6
	93600	135600	173600	210000	242000	5
	117600	169200	217600	262000	302400	4
	156000	225600	289600	349000	403200	3
1 3/8"	93600	135600	174400	210000	242000	6
	112800	162600	209600	252000	291600	5
	140800	203400	261600	315000	364800	4
	188000	271200	348800	420000	486000	3

type drilling line

J&L SPRING-CENTER

(PROVED BY EXTENSIVE FIELD TESTING ON THE JOB)

HOW IT SAVES YOU MONEY
You pay NOTHING EXTRA for J&L SPRING-CENTER. Although it's a *premium product* . . . you pay no more.

Jones & Laughlin Steel Corporation
416 Gateway Center
Pittsburgh 30, Pa.

I'd like to have more information on J&L SPRING-CENTER DRILLING LINES. Please have your representative call.

Name_____

Title_____

Company_____

Address_____

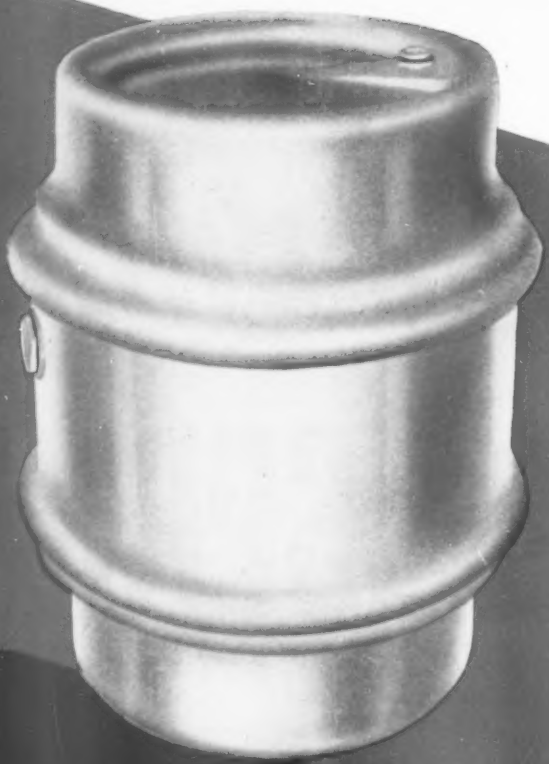
You'll want to get complete information on this latest J&L Drilling Line. Let us discuss J&L SPRING-CENTER with you.

JONES & LAUGHLIN STEEL CORPORATION
Wire Rope Division
PITTSBURGH

CLINCH THE

SALE

WITH



BENSON ALUMINUM DRUMS

1 Benson Aluminum Drums Cut Replacement Costs ... they outlast and outperform other types of shipping containers—have high salvage value.

2 Benson Aluminum Drums Reduce Labor and Material Costs ... they are non-rusting; do not need maintenance and service.

3 Benson Aluminum Drums Slash Shipping Charges ... their light weight also reduces handling costs for both you and your customers.

4 Benson Aluminum Drums Protect Your Chemical Investment ... they keep your shipment safe against contamination and spoilage.

Put another salesman to work for you—*your shipping containers!* Use gleaming, sturdy, modern Benson Aluminum Drums as one of the best representatives your company can have. Strong, lightweight, corrosion-resistant aluminum drums are available in a number of styles and sizes for shipping acids, alcohols, aniline, fats and oils, liquid fertilizers, formaldehyde, hydrazine, hydrogen peroxide, inflammables and explosives, insecticides and poisons, premium petroleum products and many specialized products of the process industries. For further information contact any Reynolds office or write direct to Reynolds Metals Company, 2595 South Third Street, Louisville 1, Kentucky.

REYNOLDS ALUMINUM

EXCLUSIVE SALES AGENTS FOR BENSON CHEMICAL DRUMS

★ For working pressures from 1500 to 3000 lbs.

★ All parts interchangeable

★ Bean is quickly and easily replaced

★ Easily converted to positive choke

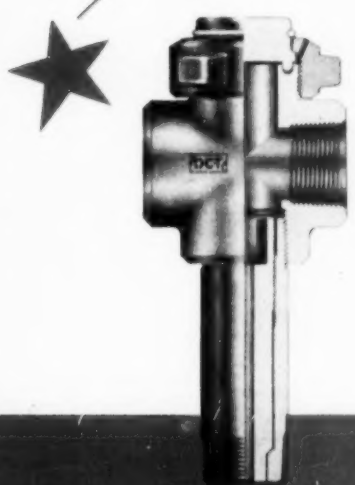
O-C-T THREADED ADJUSTABLE CHOKES GIVE YOU

Four Star Flexibility

The O-C-T Type "N" Adjustable Choke has earned its reputation as the most popular choke in the field by outstanding, dependable performance.

In combination with O-C-T flow tees, this choke can be converted to a positive choke to make proration tests, by backing off the adjustable yoke assembly and inserting the proper size O-C-T FC-140 positive bean or FC-141 insert type cage bean.

Ask your O-C-T representative or write for complete mechanical details on the O-C-T Choke that gives you four star flexibility. Available through your supply store.

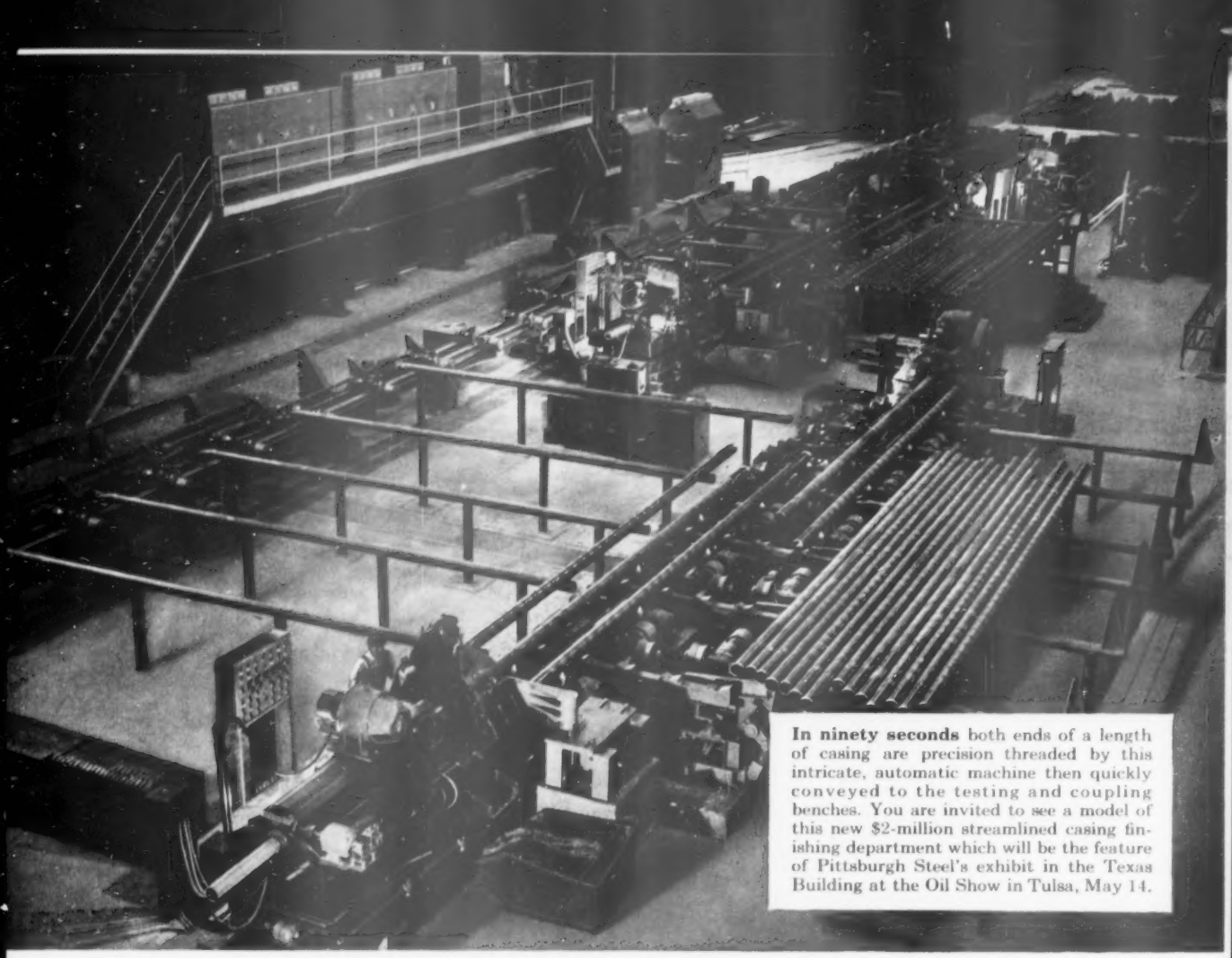


Oil Center Tool Co.

P. O. Box 3091 Houston, Texas

Export Representatives: Sterling Areas — Le Grand, Sutcliff & Gull, Ltd., Rochester, Kent, England. Address Export Inquiries for All Other Countries to P. O. Box 3091, Houston 1, Texas

O-C-T HAS PIONEERED HIGH PRESSURE CONTROLS



In ninety seconds both ends of a length of casing are precision threaded by this intricate, automatic machine then quickly conveyed to the testing and coupling benches. You are invited to see a model of this new $2-million streamlined casing finishing department which will be the feature of Pittsburgh Steel's exhibit in the Texas Building at the Oil Show in Tulsa, May 14.

Completely New

Since oil was first discovered, oil well casing has played an important part in its recovery. For half a century Pittsburgh Steel Company has served this vital industry by developing and producing improved types of seamless steel casing, drill pipe and tubing . . . making it possible to drill safer, easier, faster and with increased efficiency.

As a pioneer in precision threading, Pittsburgh Steel today carries on that tradition with the construction of a complete new department for the finishing of seamless casing. The most modern automatic threading equipment, hydrostatic test bench, coupling screw-on machines, inspection tables, scales and other auxiliary equipment has been installed in this new building to streamline the finishing operation. Production is speeded . . . quality held high by this $2-million project.

These new facilities are an important part of the Program of Progress which is transforming Pittsburgh Steel into a new steel company. In addition to improving facilities for making tubular and wire products, the program provides for increases in steel making capacity of 48% and in finished product capacity of 82%. This $62-million plan, rapidly nearing completion, includes the construction of continuous hot and cold rolled sheet mills to broaden the company's line of products and widen the scope of its service.

As a new steel company Pittsburgh Steel is strengthening its position in the industry—benefiting its customers by affording them a dependable source of material—its employees by providing steadier work—its stockholders by increasing the earning potential. Likewise, it helps the nation build high the bulwarks of a strong defense against economic and military aggression.

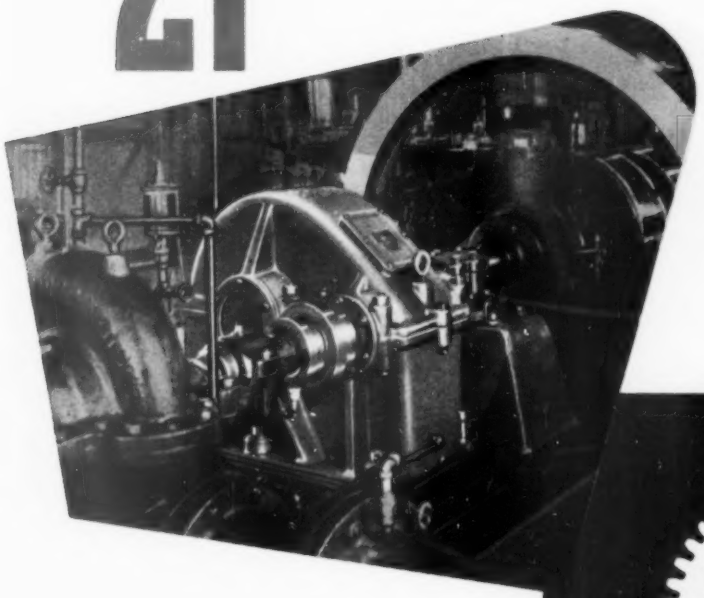
Program of Progress

Acquisition of Thomas Steel	**100%** Complete
Increase of Blast Furnace Capacity by 12%	75% Complete
Increase of Open Hearth Capacity by 48%	74% Complete
Installation of new 66-inch High Lift Blooming-Slabbing Mill	**100%** Complete
Installation of Continuous 66-inch Hot Rolled Sheet-Strip Mill	94% Complete
Installation of 66-inch Cold Rolled Sheet-Strip Mill	80% Complete

Pittsburgh Steel Company

Pittsburgh 30, Pennsylvania

21 YEARS of CONTINUOUS SERVICE...



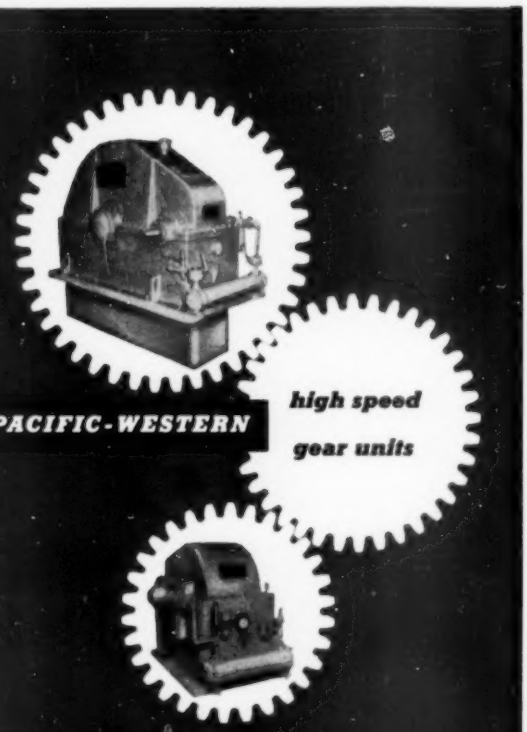
You can Rely on WESTERN GEAR HIGH SPEED GEAR UNITS!

21 years of continued operation, with no record of factory service required for repairs, is the proud claim of a Pacific-Western high speed unit still giving 24-hour duty in a Southern California pumping station.

Specify, with confidence, Pacific-Western high speed units, whenever an increase in speed is required between prime mover and driven equipment. A background of continuous, specialized research and development, plus the accumulated experience gained in 65 years of designing and manufacturing gears and geared products, assures you of the finest equipment available anywhere, for application to your specific requirements.

For complete information, send for our new Bulletin No. 5204 H.S.

Use the coupon below.



WESTERN GEAR WORKS

Manufacturers of **PACIFIC-WESTERN** Gear Products

Pacific Gear & Tool Works

Plants: **Seattle**
San Francisco
Belmont (S. F. Peninsula)
Lynwood (Los Angeles County)
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Write, wire or phone your nearest Pacific-Western office

Plants — 417 Ninth Ave. S., Seattle 4, Washington
2600 E. Imperial Highway, Lynwood (Los Angeles County), California
1035 Folsom St., San Francisco 3, California
Belmont (San Francisco Peninsula), California
117 N. Palmer St., Houston 3, Texas

Representatives N. 2605 Division St., Spokane, Washington
930 S. E. Oak St., Portland 14, Oregon
Room 212, Ross Bldg., Denver 2, Colorado
500 South Ervay Street, Dallas, Texas
Engineering & Machinery Ltd., 1366 W. Broadway, Vancouver, B.C.

WESTERN GEAR WORKS WG-122

Executive Offices, Post Office Box 182, Lynwood, California.

Send free copy of **Bulletin 5204 H.S.** to:

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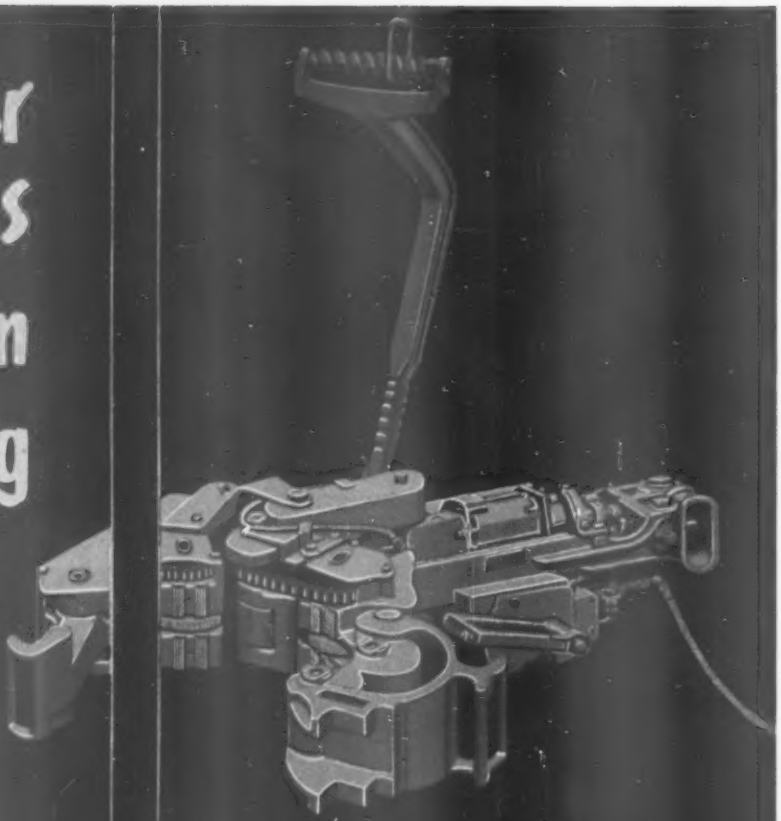
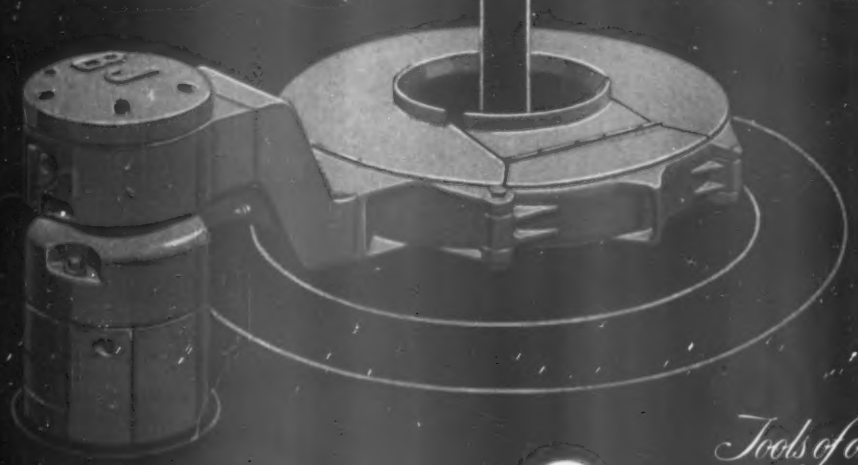
power pays off in drilling



POWER TONG

BJ

POWER SLIPS



Tools of our Trade No. 4

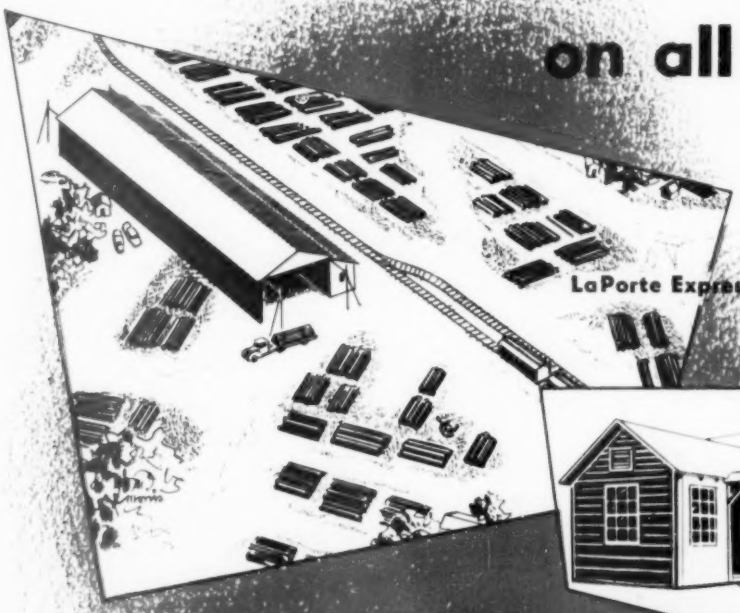
BJ MEANS ENGINEERED OIL TOOLS

BJ PB

Byron Jackson Co. *Since 1872*

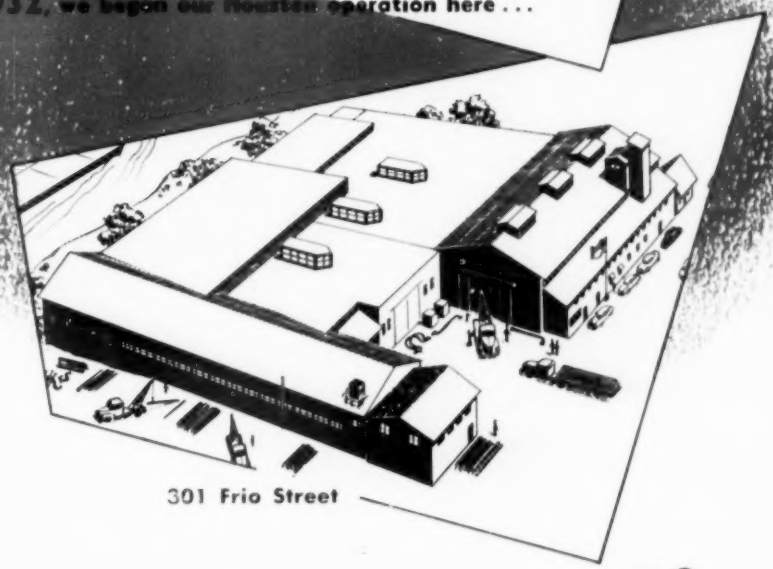
LOS ANGELES NEW YORK FORT WORTH HOUSTON

2 plants to serve you quickly . . . . on all PIPE BENDS



LaPorte Expressway at the Old Galveston Highway

1932, we began our Houston operation here . . .



301 Frio Street

Dependable fabrication since 1932

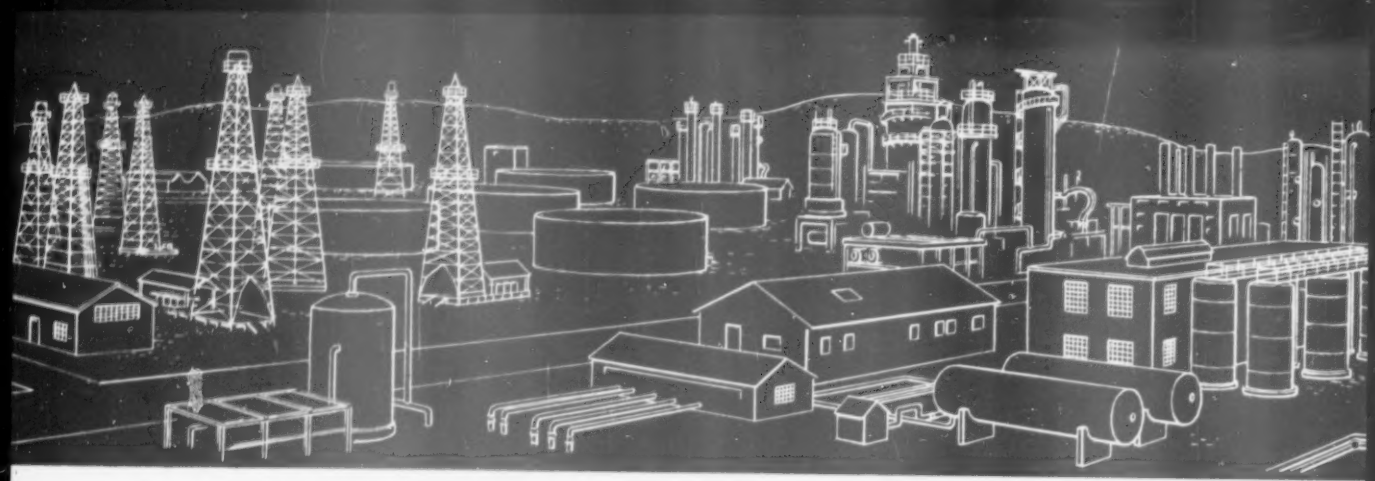
TEXAS PIPE BENDING COMPANY

PIPE BENDS
PIPE COILS
WELDED HEADERS

Pipe Fabricators
HOUSTON TEXAS

OFFICE AND PLANT
301 FRIO STREET
WEntworth 6605

7 EAST 42 ST., NEW YORK CITY ★ 444 NORTH LA SALLE ST., CHICAGO ★ 317 CITIZENS BLDG., CLEVELAND, O.



How Rockwell Serves

CHRISTMAS TREES

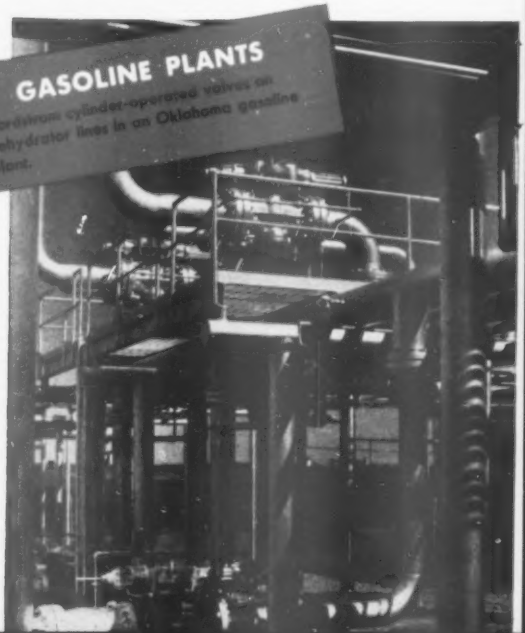
Nordstrom valve-equipped Christmas tree on flowing well.

PRODUCTION SERVICES

Production header with manifold of Nordstrom valves on lines from twenty-one flowing wells.

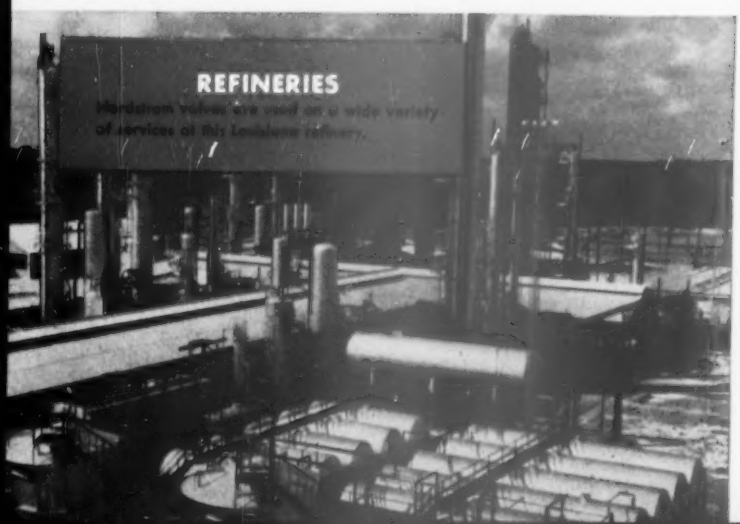
GASOLINE PLANTS

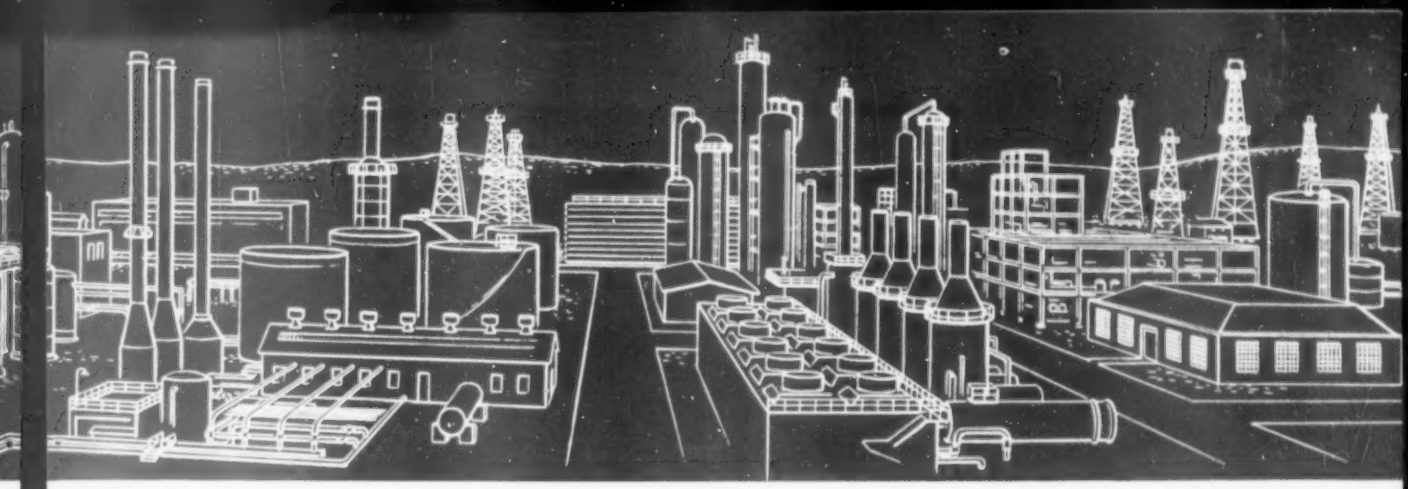
Nordstrom cylinder-operated valves on dehydrator lines in an Oklahoma gasoline plant.



REFINERIES

Nordstrom valves are used on a wide variety of services at this Louisiana refinery.





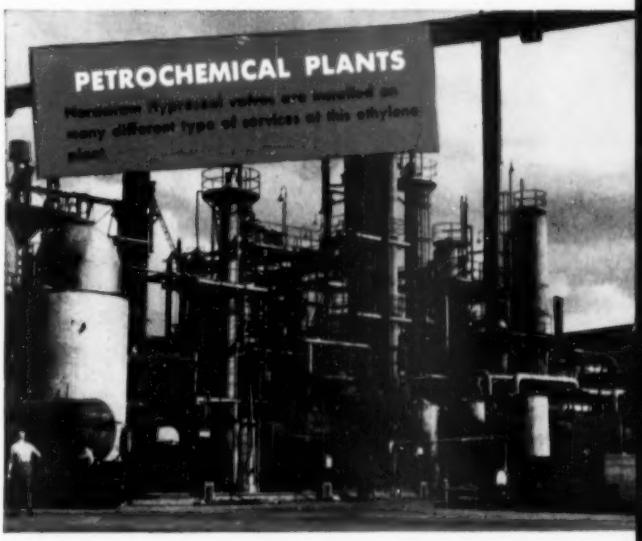
The Oil Industry...
FROM WELL TO CONSUMER

Rockwell products have proven their efficiency in hundreds of applications throughout the Oil Industry.

Nordstrom Lubricant-Sealed valves, Rockwell Rotocycle meters, and Rockwell Industrial meters are in operation on all types of Oil Industry services requiring accurate measurement and control.

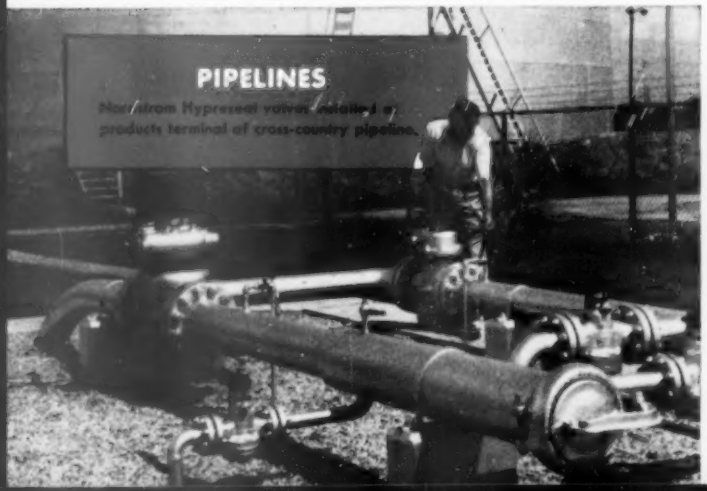
You are cordially invited to visit our exhibit* at the Oil Show in Tulsa. Courteous sales engineers will be on hand at all times to give you information on any product in the Rockwell line.

**Booths 33 through 38, Scientific and Technical Building*



ROCKWELL MANUFACTURING COMPANY

PITTSBURGH 8, PA. Atlanta Boston Chicago Houston Los Angeles
N. Kansas City New York Pittsburgh San Francisco Seattle Tulsa



NEW!

Complete

"Packaged" Control

for Unattended

Pipeline Stations

See it in operation at I.P.E.,
Tulsa—May 14-23
Booth 80N (North Entrance)

FOXBORO
Reg. U. S. Pat. Off.

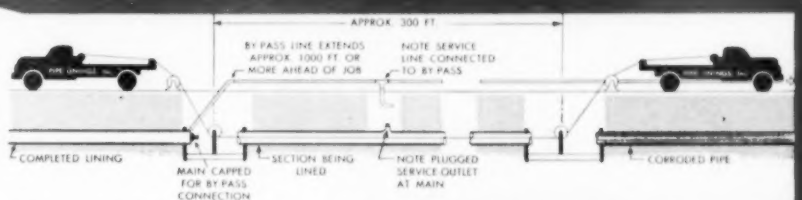
THE FOXBORO COMPANY
605 Neponset Ave., Foxboro, Mass., U. S. A.
FACTORIES IN THE UNITED STATES, CANADA AND ENGLAND

here is an earth pipe...

In remote parts of Asia and Africa where suitable wood and stone are scarce, aborigines made primitive pipes by forming the bowl of clay or damp earth and thrusting into it a long hollow reed for the stem. Chances were good the native absorbed as much dirt and dust as he did smoke. Compared to today's clean, "easy-draw" pipes, smoking was no pleasure!

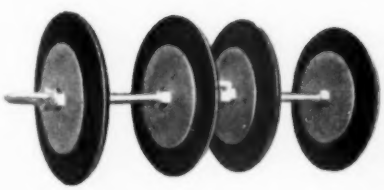
here is a modern pipe lining operation...

applicable to water, oil and gas pipe lines . . . using the Tate Process to renew old iron and steel pipe lines "in place"... up to 16" in diameter . . . with only momentary interruption to service while installing bypass sections.


APPROX. 300 FT.
BY PASS LINE EXTENDS APPROX. 1000 FT. OR MORE AHEAD OF JOB
NOTE SERVICE LINE CONNECTED TO BY-PASS
COMPLETED LINING
MAIN CAPPED FOR BY-PASS CONNECTION
SECTION BEING LINED
NOTE PLUGGED SERVICE OUTLET AT MAIN
CORRODED PIPE

here is the Steel Scraper which is pulled through the pipe. It dislodges tubercles and incrustation and makes the inside of the pipe clean and smooth.

here is the Rubber Swabber which follows the steel scraper. It drags out all loosened material and makes sure that the inside of the pipe is free and clear.



here is the Tate Process liner. It completes the renewing process by squeezing cement mortar onto the inside of the pipe wall making a smooth, continuous, water-proof lining. Liquids move swiftly without drag. Favorable flow coefficients are restored.

When renewed by the Tate Process, your old pipe...

looks and performs like new pipe!

CEMENT MORTAR LINING GIVES YOU ALL THESE ADVANTAGES....

- New pipe performance
- Prevents leakage
- Restores full flow coefficients
- Reduces pumping and maintenance costs
- Protects against corrosion, contamination and discoloration . . . at much less than the cost of installing new pipe!

Pipe Linings, Inc. offers "in place" Tate Process lining service for pipe 4" to 16" and "in place" Centriline Process lining service for pipe 16" to 144". Expert, trained crews. Complete mobile equipment and facilities.

A Pipe Linings hydraulic engineer will be glad to help you. No obligation!

Write today for details on handy coupon.

PIPE LININGS, Inc.

PIPE LININGS, Inc.
(A subsidiary of American Pipe and Construction Co.)
4675 Firestone Blvd., South Gate, California

- ☐ Please send complete information on how to obtain new pipe line performance from my old pipe.
- ☐ Please have one of your hydraulic engineers call on me.

Name _____

Title _____

Company _____

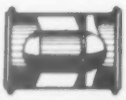
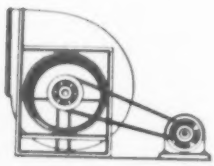
Address _____

City _____ State _____

4675 Firestone Blvd., South Gate, California
(A subsidiary of American Pipe and Construction Co.)

"Buffalo" *Tips on Getting the Best Service from your* **Fans**

MAKING THE RIGHT SELECTION

AXIAL FLOW?  or CENTRIFUGAL? 

Centrifugal fans like this "Buffalo" Limit-Load model are generally the first choice for large ventilation, exhaust and air conditioning systems. Their efficiency is high even when installation is at a curve in the duct. Medium speed fans, they are ideal for handling large volumes of air quietly at medium pressures. "Buffalo" Limit-Load Fans have the additional advantage of being non-overloading, regardless of the system pressure. For further factors in the selection of a centrifugal fan, write for Bulletin 3737.

"Buffalo" BUILDS BOTH TYPES—

Axial Flows, on the other hand, move air by the propeller principle, straight through the fan housing. These fans will thus be the most efficient mounted in straight runs of duct. They are ideal for light-duty ventilation and air conditioning service at pressures to around 2″. Axial flows are higher velocity fans than centrifugals, are lighter weight and more compact than centrifugal fans, therefore lower cost for cut-mounting on ceilings, walls, etc. However, the performance curve is often the last analysis in your choice of fan for each job. "Buffalo" Bulletin 3533-C contains a comparison performance chart of both "Buffalo" Limit-Load Fans and Axial Flows. A copy will be mailed to you on request.

DIAMOND JUBILEE 75TH ANNIVERSARY

"Buffalo" FIRST FOR FANS

BUFFALO FORGE COMPANY

525 BROADWAY BUFFALO, NEW YORK

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Sales Representatives in all Principal Cities

VENTILATING | PRESSURE BLOWING | AIR CLEANING | COOLING | AIR TEMPERING | HEATING | INDUCED DRAFT | FORCED DRAFT | EXHAUSTING

They call it

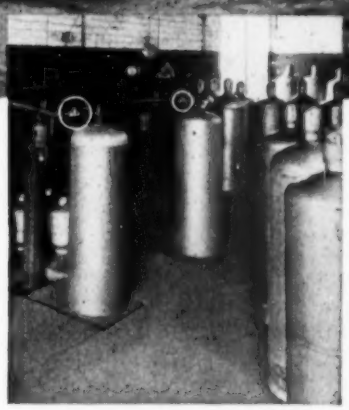
"THE LEAK-PROOF FLEET"—

It's equipped with Rockwood Ball Valves

Carrying bottle gas in bulk over city streets is ticklish business.

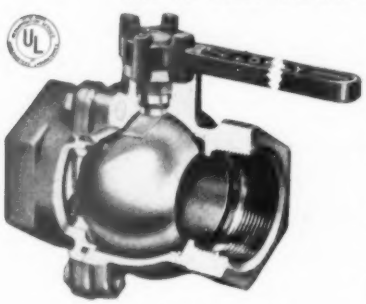
But this large Transport Company made one decision and stopped a thousand worries. They equipped the fleet throughout with Rockwood Ball Valves. Not even the bumps of rough pavements or the jolts of quick stops and starts unseat these close-fitting valves.

Best part of it is, Rockwood Valves *stay* leak-proof. They resist wear, yet retain the quick-opening and closing features. They require no maintenance.



Rockwood Ball Valves handling "bottled gas" are operated every two minutes during the day. Tight seal makes them real production boosters and cost cutters.

WHAT YOU WANT . . . ROCKWOOD HAS



Tested by Underwriters' Laboratories, Inc.

Full Round Flow, with no change in shape or volume of the fluid and no turbulence. Minimum friction loss.

Quick Operation in opening and closing means faster loading and unloading.

Long Life, because made to resist abrasion and wear.

Low Maintenance because engineered to stand up under an anticipated daily grind.

ROCKWOOD *FULL-FLOW* BALL VALVES

THE FLOW IS AS ROUND AS THE PIPE ITSELF

Get complete details on this great new advancement in valve engineering. Send for booklet.

Distributors in all principal cities

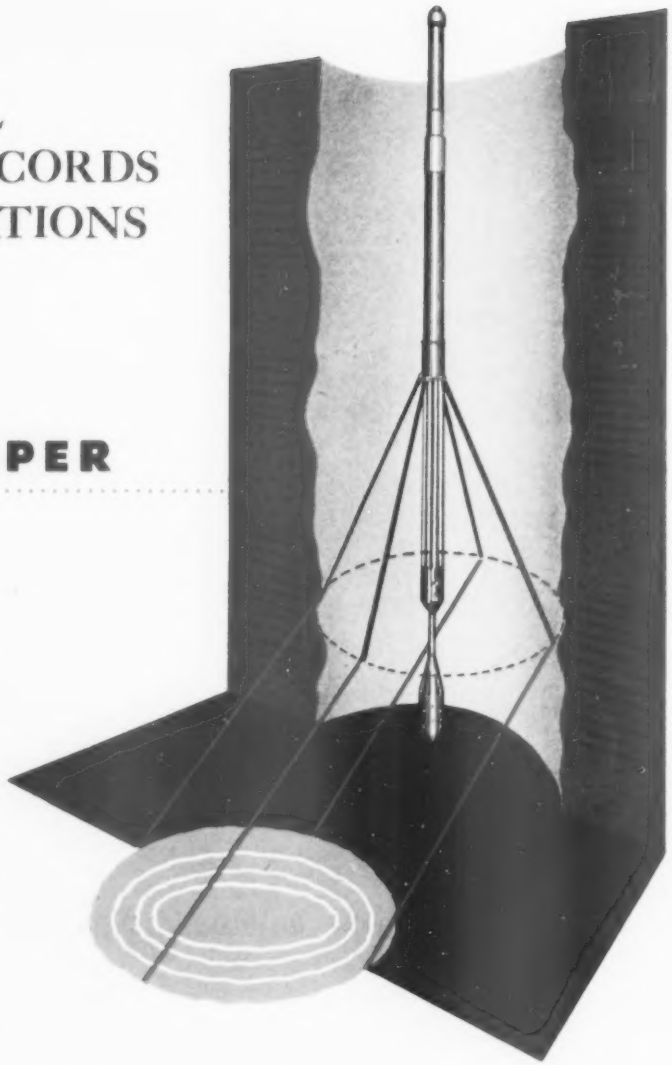
ROCKWOOD SPRINKLER COMPANY
104 HARLOW ST., WORCESTER 5, MASS.

Send me illustrated folder V-4 on Rockwood Full-Flow Ball Valves.

Name .....
Title .....
Company .....
Street .....
City .....
Zone ..... State .....

VERSATILE TOOL ACCURATELY RECORDS HOLE SIZE VARIATIONS

HALLIBURTON'S ELECTRIC CALIPER



Versatility is proving an increasingly important factor in the success of Halliburton's Electric Caliper. Operators find that the accurate record of hole size variations revealed by this tool has a wide variety of uses in drilling and completion.

The Electric Caliper's primary job is to provide a sharp down hole profile for determining the amount of cement needed behind casing or liner, or for plugging back open hole. But it has additional valuable uses – in packer setting, casing perforation, gravel packing, acidizing, side wall coring, fishing jobs, and formation logging.

Halliburton's Caliper operates simply. Four spring-driven arms that contact the wall of the bore hole are released to open position at the start of the run and as the Caliper is pulled up, ride the changing profile of the hole. Diameter variations resulting from ledges, crevices, and formation casings are transmitted by electrical circuit to a rheostat at the surface.

Hole diameter is recorded – at a speed of about 200 feet a minute – on film as a calibrated caliper log. Scale selections that amplify laterally also make possible studies involving mud cake thickness, precise bed boundaries, and correlation with other electrical surveys.

The Electric Caliper can serve you well, at low investment – in a variety of ways – by providing sharper record of hole size variations. Phone you nearby Halliburton representative. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

YEARS AHEAD IN WELL LOGGING TECHNIQUES

Oil Painting by Tom Hill especially for Barrett Division

Hot stuff...for rough duty!

To assure pipe preservation, protective coal-tar enamels must be applied while hot. Two factors are all important if pipelines are to survive tough climates and rough conditions. One is the *right* protective coating. The other — proper application. When you specify Barrett — you can get *both!*

Barrett not only offers the finest protective coatings, but also the services of a Barrett Technical Advisor. He will help you to determine the *exact* coating to meet specific needs and requirements and still keep cost to a minimum.

In the field, where pipe preparation and coating application are of vital importance, a Barrett field inspector is available to advise and render aid learned from years of pipeline experience. Barrett inspectors are available whenever needed. It is for this purpose that Barrett maintains field offices strategically located throughout the country.

Write, phone or wire for further information and a free copy of Barrett's Field Manual. It's a valuable book concerned with detailed application procedures. Send for it today.

Barrett®

BARRETT DIVISION

40 Rector Street Allied Chemical New York 6, N. Y.

In Canada: The Barrett Company, Ltd.
5551 St. Hubert St., Montreal

in this little bag of beans

42

sizes of economical

UNIBOLT

- Christmas Tree Flow Manifolds
- Positive Chokes
- Cage Nipples
- Tees and Crosses
- Couplings and Blanking Plugs

FLOW-RATED X-BEAN INSERTS UNDER 14/64ths

total of 74 sizes of X-BEANS up to ½ inch!

UNIBOLT Flow Rated X-Beans, for use with UNIBOLT Choke Bodies and Cage Nipples exclusively, are drilled in increments of 5 percent and 10 percent of *well flow* rather than in increments of 1/64-inch. Consequently, the flow of fluid or gas can be positively controlled with a degree of accuracy never before attained. If, for example, a well produces 10 bbls. through a 1/64-inch choke, to increase the choke to the next largest fractionally drilled size, 2/64-inch, would increase the production to approximately 40 bbls. On the other hand, a well that produces 10 bbls. through a size X-35 UNIBOLT X-Bean would produce only 10½ bbls. through the next largest size X-Bean, X-35.5; 11 bbls. through an X-36, and so on.

This accurate control of production is a safeguard against the harmful effect of periodically pulling a well too hard in order to make its allowable.

THORNHILL-CRAVER COMPANY

P. O. BOX 1184 • HOUSTON, TEXAS

Another milestone...

THE NEW SCHLUMBERGER HEADQUARTERS

At the new Schlumberger headquarters on the Gulf Freeway in Houston, the instruments, trucks and equipment are built to provide the oil industry with 25 specialized services throughout the United States and Canada.

SCHLUMBERGER

WELL SURVEYING CORPORATION — HOUSTON

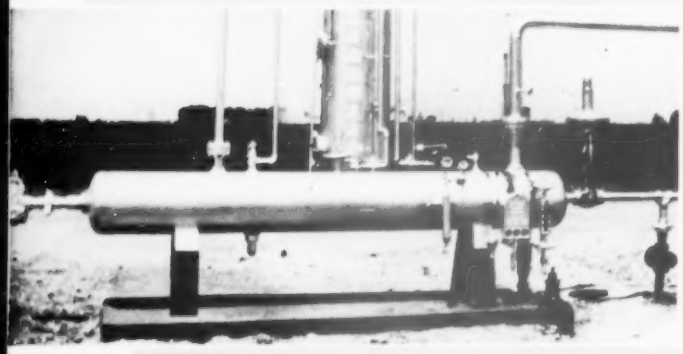
ALL OF THESE ADVANTAGES . . .

1. 20% slower gas flow than in comparable two tube designs — more effective natural separation.
2. 20% greater interface area — more thorough and complete degassing.
3. Freezing trouble minimized. Liquid in contact with, and warmed by, gas stream.
4. Longer retention time allows more time for oil to give up its gas.
5. Exclusive No-Bleed Liquid Level Controller. Non-freezing, non-plugging.
6. Easier cleaning. Only one tube to clean, unobstructed along bottom, has three drains instead of one.

and Flexibility too..

WITH PARKERSBURG HORIZONTAL SEPARATORS

● *Ask your Parkersburg Representative for complete details about the advantages and flexibility of the Parkersburg Horizontal Separators.*

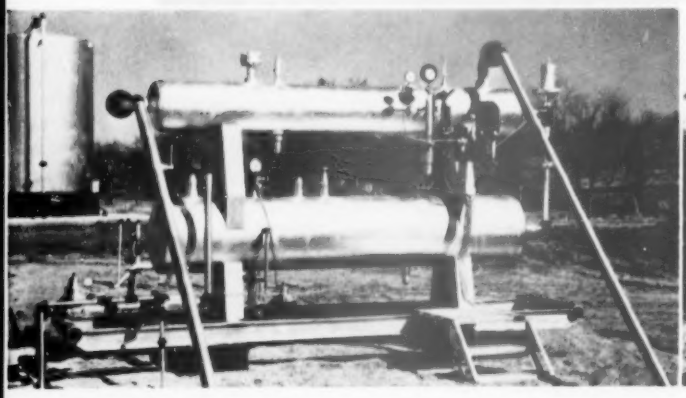


SINGLE STAGE SEPARATION: The Parkersburg large diameter single tube horizontal separator meets every demand for more efficient, more economical, larger volume separation. It does a far more efficient job of separating than comparable two tube separators.

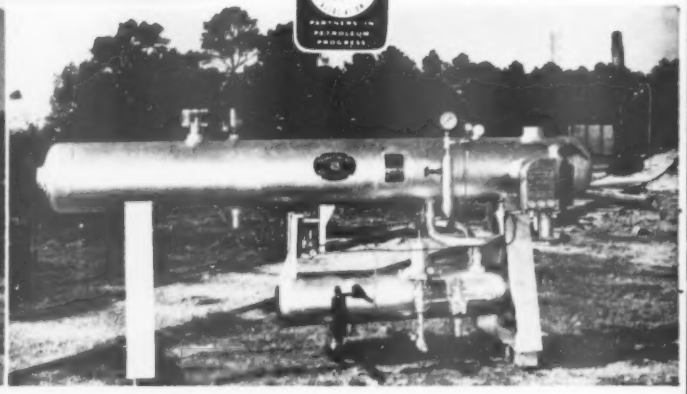
PESA

PARTNERS IN PETROLEUM PROGRESS

No. 5310



TWO STAGE SEPARATION: A standard Type "S" high-pressure separator mounted on top of the low-pressure separator gives the operator a highly efficient, compact, unitized two stage separation unit. These separators can be used individually simply by breaking down the assembly.



THREE PHASE SEPARATOR: The addition of the lower vessel from our standard Hydracepter Water Knockout to our standard Type "S" Horizontal Separator produces an effective three phase separator for removing free water.

PARKERSBURG

PRESSURE EQUIPMENT

HORIZONTAL AND VERTICAL SEPARATORS • HYRECO • HYDRACEPTER • SCRUBBERS • TREATERS • HEATERS

Manufactured in Houston, Texas

ORIGINATORS OF Welex JET PERFORATING

THE SIGN OF DEEPER PENETRATION IN PERFORATING

Results cost less with Welex jets . . . because the Welex crew that comes to perforate your well is backed by the most extensive, most experienced jet perforating research organization in the industry. Welex is largely responsible for the many advancements in jet perforating techniques and equipment that have been provided the oil industry.

Welex research and development has transformed both casing perforating and open hole shooting from hazardous, unpredictable operations to precision processes that give clean, positive penetration and improved well productivity.

Welex

JET SERVICES INC.

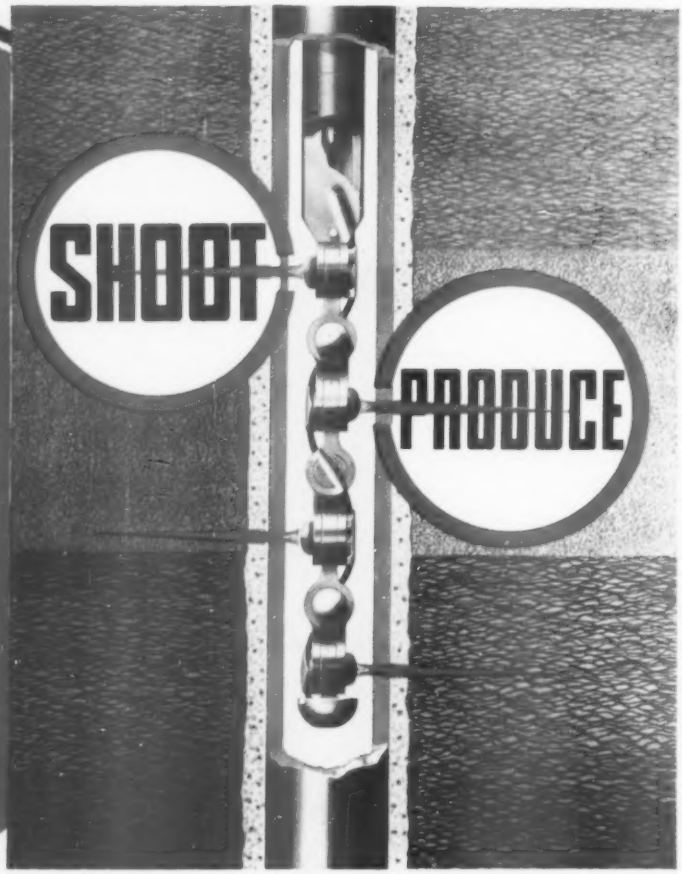
General Offices: 3909 Hemphill St.
Fort Worth 10, Texas

Welex gives you more years of jet perforating experience . . .
more technical know-how . . .
more assurance of profitable results.
Call on Welex for prompt service at your well day or night.

"Call Welex and be SURE"

Satisfied Customers are Asking . . .

WHY DIDN'T SOMEBODY THINK OF THIS BEFORE?



The JOHNSTON *Expendable* JET GUN is one of the Most Remarkable Developments in Well Completion!

• *The JOHNSTON Shoot and Produce Method permits:*

1. Perforating a producing formation with oil opposite the formation . . . rather than shooting through mud column.
2. The elimination of perforation plugging with mud.
3. Accurate collar locator.
4. Safety advantage of having Christmas Tree and other surface connections completely installed prior to perforating.
5. Use of the conventional hollow tube jet carrier with duPont charge or the Johnston chain link expendable carrier with TORPEDO JETS.
6. Saves hours and in some cases days of rig time.

JOHNSTON TESTERS, INC.

POST OFFICE BOX 165 HOUSTON, TEXAS

EXPORT DIVISION: 3035 Andrita St., Los Angeles 65, California
SERVICE BRANCHES IN ALL ACTIVE AREAS
There's a Johnston Service Representative Near You

FORMATION AND CASING TESTING — JOHNSTON

Why waste time with clumsy pipe-coating equipment?

Look! All you need is "SCOTCHRAP"!

Pipeline under Genesee River, N.Y.

You've had problems like this before: you're laying a pipeline under a river bed. You know you'll need a dependable anti-corrosion coating.

Empire Gas and Fuel Company, Wellsville, N. Y., had the same problem here. They solved it the fastest, easiest way—with "Scotchrap" Pipe Insulation.

"Scotchrap" is fast because it requires no special applicating machinery. In this case, two men wrapped 100 feet of 8-inch line in just 30 minutes.

And "Scotchrap" is easy because it sticks right off the roll—stretches to conform tightly to the job. No dangerous hot coatings needed.

Try it yourself and see! See how the tough vinyl-plastic "Scotchrap" resists acids, alkalies, oils—even galvanic and electrolytic action. See how it *lasts*.

"Scotchrap" Pipe Insulation is sold by the square 1″, 2″, 4″, 6″, 8″ and 12″ widths. Order a supply today!

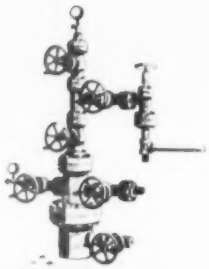
SCOTCHRAP BRAND PIPE INSULATION

3M COMPANY

The term "Scotch" and the plaid design are registered trademarks for the more than 200 pressure-sensitive adhesive tapes made in U.S.A. by **Minnesota Mining & Mfg. Co., St. Paul 6, Minn.**—also makers of "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Abrasives, "3M" Adhesives. General Export: 122 E. 42nd St., New York 17, N. Y. In Canada: London, Ont., Can.

BIW NON-LUBRICATED GATE VALVE

The BIW Valve has been proved dependable under the most difficult well conditions. The heavy duty thrust stem bearing makes opening and closing easy without the use of a cheater. A positive, tight shut-off is made every time because the BIW Valve is non-lubricated, requires little attention, and effects a tight closure with metal-to-metal seals.



The positive operation of the BIW Valve is a feature of the complete BIW Tree

The complete BIW Tree puts the undivided responsibility of one of the industry's oldest manufacturers squarely behind your well. In East Texas, the Gulf Coast, and the Permian Basin, BIW well head equipment has proved itself over the years under practically all well conditions. When you invest in well head equipment, invest for the life of the well with the complete BIW Tree. BIW Well Head Equipment is built from 1,000 to 10,000 pounds working pressure and combines the latest in engineering design with the best in field practice.

BIW

BEAUMONT IRON WORKS CO.

BEAUMONT, TEXAS

Subsidiary of American Locomotive Co.
General Sales Office: 1404 Dunlavy St., Houston 19, Texas
Warehouses in Beaumont and Odessa

They Say—

Petroleum's Record

"Investments in petroleum facilities are now $43,000,000,000. Agriculture leads all industries with investments of $170,000,000,000. Pblic utilities are second with $52,000,000,000. Since 1946, the petroleum industry has spent over $20,000,000,000 to satisfy the unprecedented requirements for its products.

"Petroleum has contributed not only to the mechanization of farming, but also to the provision of various chemical products such as fertilizers, insecticides, weed killers, and a host of other products which have caused a complete revolution in agricultural methods. In addition, systematic use of insecticides derived from petroleum eventually will eliminate completely the $4,000,000,000 annual loss now suffered by farmers from insects."

Dr. Gustav Egloff, Universal Oil Products Co., Chicago, before the Bond Club of Chicago.

"Natural-Gas Boom"

"The increasing demand for natural gas in distant states is credited with field price advances which already have begun to exceed the late 10 cents per 1,000 cu. ft. 'ceiling.' Talks of added price boosts . . . is common in the industry.

"The keenest current demand reportedly is from New England cities, while the Pacific Northwest is a virgin field. Apparently the only barriers to large expansion there are contests between transmission companies for service rights, and laying of pipe lines and distributors. Meanwhile new transmission networks already are stretching from the production areas, and applications for numerous additions are pending. The Petroleum Administration for Defense has estimated that national peak-day supply will increase from 30 to 38 billion cubic feet in 3 years. . .

"The prospect for still higher field prices apparently is governed entirely by the differential with respect to coal and oil prices; but 20 or 25 cents is considered attainable before competition speaks up again. This may discount the effect of 'vested appetites' for gas fuel in preference to other types. The hikes are intended to be passed on to consumers by the distributors, though in the total natural-gas fuel bill, the field price plays now, at any rate, a comparatively small part.

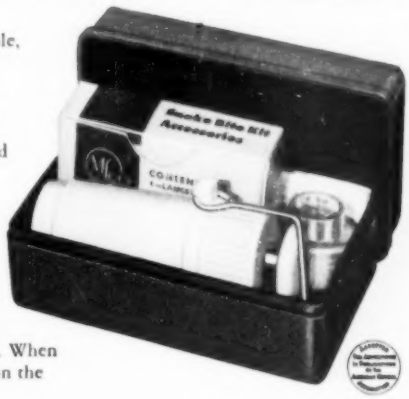
"Thus against the advantages accru-

MSCO® SNAKE BITE KIT

when the snake strikes...you have 10 minutes!

...this requires dependable, controlled suction to prevent the poison from spreading. In the New Improved Saunders* Kit, all components are packed for quick, easy use. Only the Saunders* pump carries a performance *guarantee*. Easy to operate by the victim alone if necessary. FITS ALL STANDARD UNIT TYPE FIRST AID KITS. When advisable can be carried on the person in belt pouch. Write for details.

*Patented

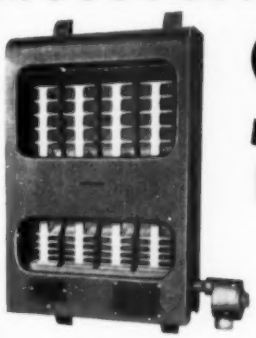


Accepted for advertising in publications of the American Medical Association.

Medical Supply Company

"It pays to buy—from Medical Supply"

ROCKFORD, ILLINOIS • IN CANADA, IT'S SAFETY SUPPLY CO.



MODEL CX-2

Available in 8 models, 3 capacities: 2000, 4000, 6000 watts 6830 to 20,490 BTU

SAFE HEAT for HAZARDOUS AREAS

The Only EXPLOSION-PROOF ELECTRIC UNIT HEATER of its kind approved by Underwriters' Laboratories and Canadian Standards Ass'n

TYPICAL USES:

Oil refineries; service and bulk gasoline stations; pump, valve and meter houses; distilleries; paint and dry cleaning plants; chemical and similar industries.

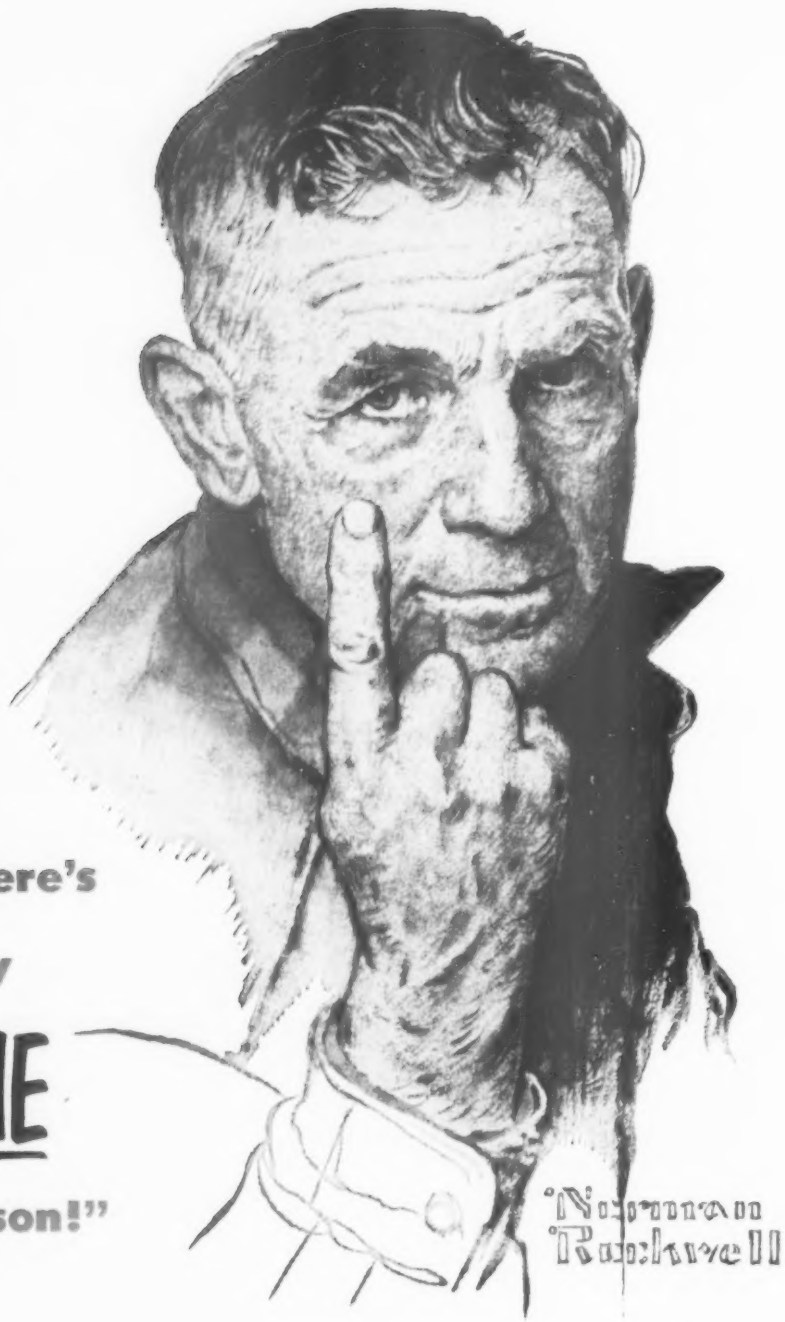
Electromode Explosion-Proof Heaters provide completely safe heat in places where atmospheres contain gasoline, petroleum, naphtha, solvent vapors, natural gas and where flammable gases, mixtures or highly flammable substances are made or stored. They conform to rigid safety specifications and are fully tested and approved by Underwriters' Laboratories for use in areas covered in Class 1, Group D.

Write Dept. OG-53 for specialized information on installation of Electromode Explosion-Proof Heaters in your plant.

ELECTROMODE CORPORATION

45 Crouch St., Rochester 3, N. Y.

Leader in Electric Heating Since 1929



IT'S JUST THAT SIMPLE. There's only one reason in the world why 2 out of 3 wire rope users in the oil fields prefer Roebling wire rope... *it costs less on the job than any other.*

For maximum wire rope efficiency and economy, call your nearest Roebling office for a Field Man. He'll recommend the best ropes for your operations... District Offices at Cleveland, Denver, Houston, Los Angeles, Odessa, Tulsa.

ROEBLING

A subsidiary of The Colorado Fuel and Iron Corporation

DISTRIBUTED BY

THE NATIONAL SUPPLY COMPANY · REPUBLIC SUPPLY COMPANY

ing to the production end of industry from the 'boom,' the areas of production face these offsets: The immediate upward pressure on their own fuel costs in a time of relatively plentiful supply and increasing demand; and the implications as to future depletion and scarcities, without the saving grace of alternate fuel supplies and with the prospect of continually soaring prices.

"Nor can the current inflationary contribution, and its possible effect on wage-price stability, be 'flared off' with any great degree of ease and comfort."

—*Editorial in The Times-Picayune, New Orleans.*

"Sow the Petroleum"

"Down in Venezuela the nation's economy has benefitted tremendously in the past 30 years by the application of a slogan, 'Sow the petroleum.'

"In the United States we would call it 'plowing back the profits.'

"The growth of Venezuela, both economically, and culturally, closely parallels the growth of her oil industry. Last year that country's wells produced 1,800,000 bbl. of crude oil a day—highest output in her history.

"Practically all of that oil was loaded into tankers for shipment to the United States, to Britain, France, and other world markets. But a sizable percentage of it, represented by taxes and fees, by wages and salaries, by trade, and profits on purchases made within that nation's borders, remained behind.

"That was 'sowing the petroleum.' The seed has converted Venezuela from a nation of mules and machetes to one of infant industry and lengthening highways. Venezuela reaches a new peak in prosperity every year.

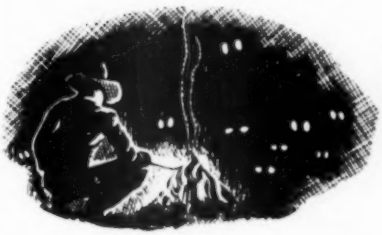
"... The International Petroleum Exposition will be held in Tulsa. Essentially it will be a technical show. It will be bright and noisy with drilling rigs, compressors, pipes, valves, drill bits, and the thousand-and-one other tools and sciences of the oil business.

"The oil show will tell that technical story well. We hope it will also tell the other story, the story of 'sow the petroleum.' For what is happening today in Venezuela has been going on for years in the United States.

"The statistics on what the oil industry has done and is doing in this country are so staggering they almost lose effect on the average mind. It employed just under half a million persons in production and refining in 1951. In 1950 it paid a total of $825,000,000 to land owners in rentals and royalties. Last year it channeled $3,621,759,000 into capital expenditures.

"In 1952 it marketed 46,437,025,000 gal. of gasoline to power the nation's automobiles, trucks, tractors, and airplanes. But on that gasoline it collected

Guard Against Intruders



WITH GOOD LIGHT

Alone in the wilderness, a man relies on the light of his tiny campfire to hold night-prowling marauders at bay. You can give your plant and personnel this same time-tested protection with Appleton Floodlights—big, rugged fixtures expressly designed to guard industrial properties while providing the good light necessary for best working conditions.

For example a series of Appleton Elipso Standlites—properly spaced along a fence-line or mounted on buildings—forms a veritable barrier of light. This is only one of the many expertly designed fixture models from the complete Appleton Floodlight line—a line that includes a sound, scientific answer to every known floodlighting problem.

For fixtures that meet every industrial requirement—including hazardous locations—whether indoors or out, contact Appleton, pace-setting manufacturer of electrical equipment for nearly half a century.

APPLETON Floodlights

ELIPSO Standlite Mounts on pole or wall.

Sold Through Electrical Wholesalers

APPLETON ELECTRIC COMPANY

1718 Wellington Avenue • Chicago 13, Illinois

CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

Sales Engineers in All Principal Markets

The pipeline system for products from the Distillation Unit at the Dunkirk Refinery of Anglo-Iranian Oil Company's French Associate, Société Générale des Huiles de Pétrole BP. The refinery now has a capacity of 45,000 barrels a day.

ANGLO-IRANIAN OIL COMPANY, with its subsidiary and associated concerns, is one of the major units of the world petroleum industry.

Its principal sources of crude oil production are in the Middle East. Through its prospecting subsidiary, the D'Arcy Exploration Company, it is interested in oil-bearing territories in many other parts of the world.

The Company operates refineries in Great Britain, Australia, France, Belgium, Germany, Italy and Israel.

Distribution and marketing of oil products are effected both by the Company itself and through various associated companies.

For sea transport its shipping subsidiary, the British Tanker Company, operates one of the largest fleets of ocean-going tankers.

The Company's principal research establishments are in Great Britain, at Sunbury in Middlesex, and at Kirklington in Nottinghamshire.

THE BP SHIELD IS THE SYMBOL OF THE WORLD-WIDE ORGANISATION OF

Anglo-Iranian Oil Company
LIMITED

REPRESENTATIVE IN U.S.A.: A. E. C. DRAKE, 610 FIFTH AVENUE, NEW YORK 20, N.Y.

$3,399,190,230 in taxes for state and federal governments. It collected over $135,000,000 more in special federal taxes on diesel oil, lubricants, and pipe lines. . .

"That is the story of a million miles of roads and highways and the ease of travel they provide; of the schools the industry has helped build; of the health program it has assisted directly as well as indirectly; of the nation's defense which, without petroleum, would be but little more effective than the bow and arrow.

"That is the story the International Petroleum Exposition should also tell well. So few know it."

—*Editorial in The Tulsa Tribune.*

CALENDAR OF EVENTS

MAY

13-14 Pacific Coast Gas Association, annual gas supply and transmission conference, Santa Barbara, Calif.

14 Conference on Instrumentation in Water, Sewage, and Industrial Waste Treatment, Manhattan College, New York.

14-23 International Petroleum Exposition, Tulsa.

15-16 International Gas Union, council meeting, Paris, France.

16 Permian Basin Geophysical Society, second annual meeting, Hotel Scharbauer, Midland, Tex.

19-22 The Institute of Gas Engineers, ninetieth annual meeting, London, England.

21-23 Panhandle Geological Society, field trip, Yucca Hotel, Raton, N. M.

24-27 American Gas Association, production and chemical conference, Hotel New Yorker, New York City.

25-28 Air Pollution Control Association, annual meeting, Lord Baltimore Hotel, Baltimore, Md.

25-29 American Society of Mechanical Engineers, annual conference and exhibit, oil and gas power division, Hotel Schroeder, Milwaukee.

27-29 Texas College of Arts and Industries, Kingsville, eighth annual short course in gas technology.

28-29 Western Petroleum Refiners Association, regional technical-industrial relations meeting, Broadview Hotel, Wichita.

28-29 Natural Gas and Petroleum Association of Canada, London, Ont.

29-30 West Texas Geological Society spring field trip, Paisano Hotel, Marfa, Tex.

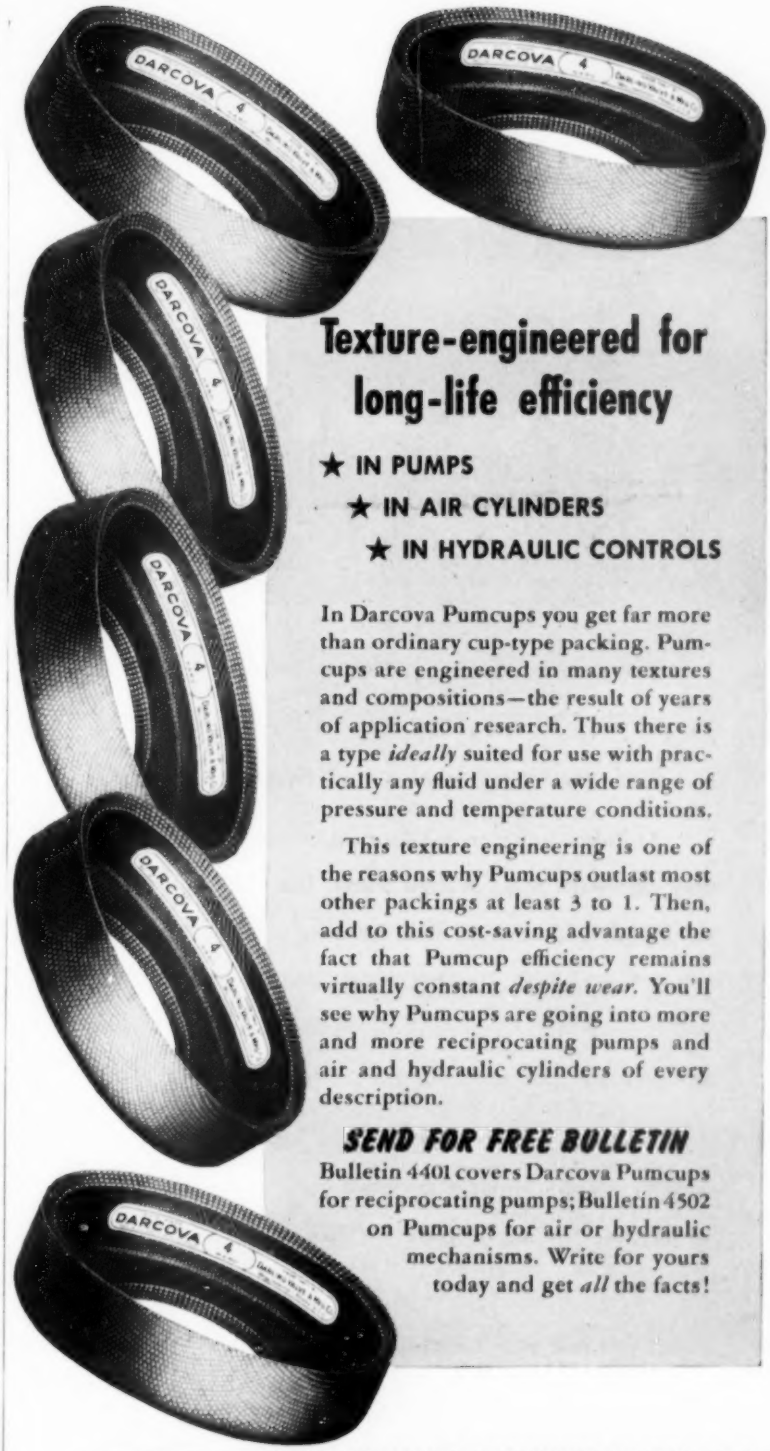
JUNE

2- 3 American Petroleum Institute, Division of Production, Pacific Coast District, Statler Hotel, Los Angeles.

4- 5 Kentucky Oil and Gas Association annual meeting, Lafayette Hotel Lexington, Ky.

7-12 Society of Automotive Engineers, summer meeting, The Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J.

14-18 Canadian Gas Association, Windsor Hotel, Montreal, Canada.



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15-19 American Association for the Advancement of Science, petroleum conference, Colby Junior College, New London, N. H.

15-19 American Institute of Electrical Engineers, summer general meeting, Chalfonte-Haddon Hall, Atlantic City.

15-19 American Petroleum Institute, Division of Production, midyear committee conference, Hotel William Penn, Pittsburgh.

16-19 American Welding Society, national spring technical meeting, Shamrock Hotel, Houston.

18-19 Western Petroleum Refiners Association, regional technical-industrial relations meeting, Conrad Hilton Hotel, Chicago.

JUNE 16-JULY

2 Intensive Course and Research Conference on Phase Behavior of the Hydrocarbons, University of Michigan, College of Engineering, Ann Arbor.

18-19 Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh.

24-27 Intermountain Association of Petroleum Geologists, fourth annual field conference, Ogden, Utah, to Jackson, Wyo.

June 28-July 2 Petroleum Equipment Suppliers Association, annual meeting, Broadmoor Hotel, Colorado Springs, Colo.

JUNE 29-JULY 3 American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

JULY

July 30-Aug. 1 Wyoming Geological Association, eighth annual field conference, University of Wyoming, Laramie.

AUG.

17-19 Society of Automotive Engineers, international West Coast meeting, Georgia Hotel, Vancouver, B. C., Canada.

18-21 American Institute of Electrical Engineers, Vancouver Hotel, Vancouver, B. C.

24-26 Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, Va.

SEPT.

6-11 American Chemical Society, national meeting, Conrad Hilton Hotel, Chicago.

9-11 Pacific Coast Gas Association, San Francisco.

11-12 Association of Desk and Derrick Clubs of North America, annual meeting, Cosmopolitan Hotel, Denver.

13-16 American Institute of Chemical Engineers, Fairmont and Mark Hopkins Hotels, San Francisco.

15-16 American Petroleum Institute, executive committee, Greenbrier Hotel, White Sulphur Springs, W. Va.

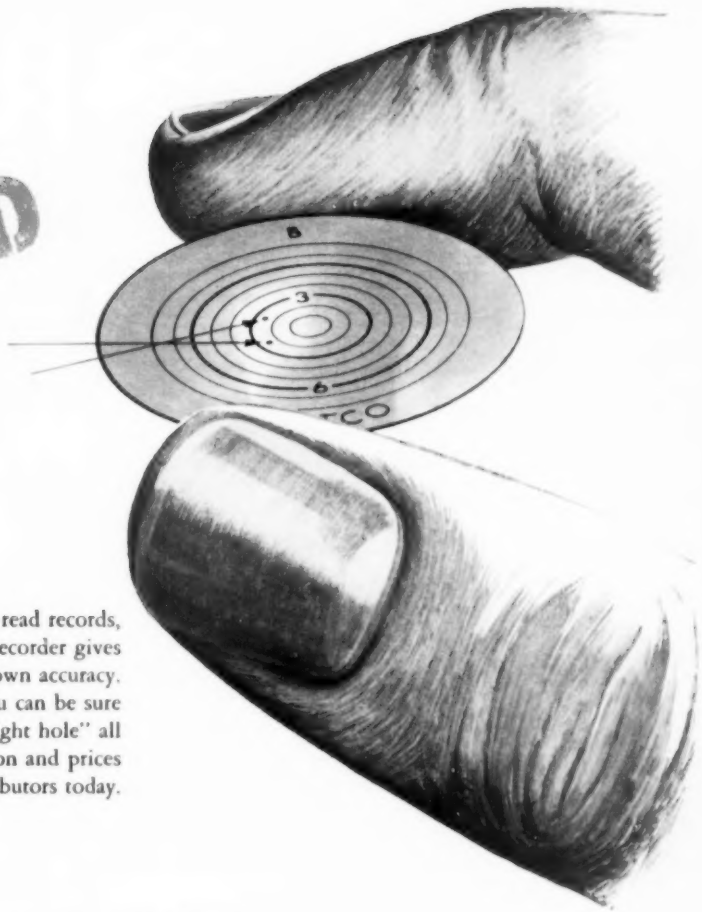
16-18 National Petroleum Association, annual meeting, Hotel Traymore, Atlantic City, N. J.

21-25 Instrument Society of America, national instrument conference and exhibit, Sherman and Morrison hotels, Chicago.

24-25 Western Petroleum Refiners Association, regional meeting, Henning Hotel, Casper.

27-30 American Society of Mechanical Engineers, annual conference, petroleum division, Rice Hotel, Houston.

VERIFIED



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THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

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JOURNALLY Speaking

Black Moment

THE oil industry's public-relations program is trying to stretch from the grass roots to the brass hats, and sometimes it brings the two together. And sometimes these comminglings of the ivory tower with the great unwashed bring surprising, and even embarrassing, results.

Such as the recent occasion when the president of a big oil company consented to be interviewed by a class of fifth-graders who had been making a study project of the oil industry. The president and his staff of public-relations experts prepared for this ordeal with great pains. They tried to anticipate all the questions that might be asked, and were ready with facts and figures, maps, and pictures.

All went swimmingly for a while. The kids had plenty of questions and they didn't hesitate to pop them, but the president had all the answers right at his finger tips and was beginning to feel pretty proud of his ability at juvenile repartee when one round-eyed urchin blandly asked:

"Why is oil black?"

If the president had been the parent of a 10-year-old he would have been used to such stoppers and would have developed a technique of double-talk which wouldn't answer the question but would satisfy the brat long enough for him to think up another one. But the president was bowled over by this question. He began to stammer something to the effect that oil isn't really black; it might be green or red, but it just looks black. Then he retired in confusion until the chaperoning teacher, wise in the ways of fifth-graders, compassionately came to his rescue by changing the subject.

Now that company's public-relations and chemical staffs are in a huddle trying to frame up a simple answer to why oil is black (or looks black even if it's green or red) so the big boss won't be tripped up by a fifth-grader again. But if we know kids, we'll bet that the president is never asked this question again but that the next batch of youngsters will come up with another angle he never thought of before.

Junior Engineers

SPEAKING of educating kids about the oil business, there is now on the market a construction kit from which youngsters can build a model oil lease, complete with derrick, pump, separator, and stock tanks. Some companies have experimented with this, but with mixed results. After one trial, one company got a request for enough kits to supply every Boy Scout troop in the state, which would cost several thousand dollars. Another put a kit in a grade school in an oil town and the kids went after it so avidly that it practically disrupted the entire educational program for a semester. Now these companies are wondering if they have a bear by the tail.

Sip, Sip, Sip

THE controversy over oil imports centers around the question of whether imports are supplementing domestic production or supplanting it, and nobody seems to be able to come up with a very clean-cut line of demarcation between the two. But Gen. Ernest Thompson, of the Texas Railroad Commission, has found a parallel which seems to fit the case.

The general says he's not opposed to a reasonable amount of imports but care must be taken to see that they don't become excessive, and it's just like the story of another general who inspected a regiment and discovered that there was excessive drinking among the men and officers. So he gave them a lecture which went something like this:

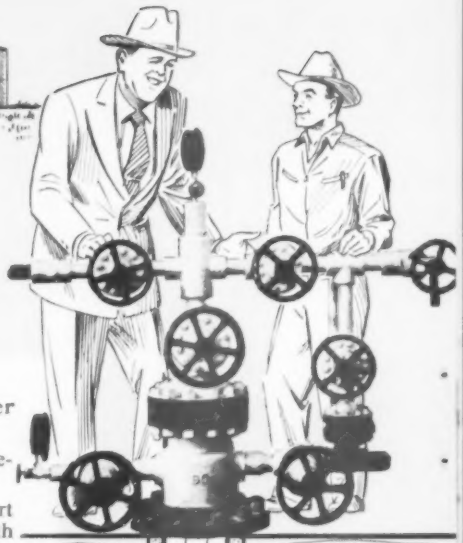
"I don't object to moderate drinking. A man needs a little drink once in a while. It's all right to have an eye-opener before breakfast, and another before starting out on maneuvers. And you need to have a flask along out in the field for a refresher, and to take an appetizer before lunch. And of course when you get back to the barracks you need a drink or two to relax before dinner, and its perfectly all right to have a few nightcaps before going to bed. But, gentlemen, this constant sip, sip, sip all day has got to stop."

Henry D. Ralph

a well-side chat

about "permanent" installations of

BAKER RETAINER PRODUCTION PACKERS



(SETTING) *Melvin Matthews, Baker Branch Manager, chats with an operator in the Magnolia Field in Southern Arkansas, who has a number of wells ready to go on the pump.*

(TIME) *December, 1952.*

Operator: What experience have you had with Baker Packers in *this* field?

Matthews: Well, we just finished setting a Baker Packer in *this* well.

Operator: What do you mean? This well has been on production for ten years.

Matthews: You're right. A Baker Model "B" Packer was run in on tubing and set in December, 1942. At that time the well had a bottom-hole pressure of 3,750 psi.

Operator: You mean the packer has been in all that time and held up for ten years?

Matthews: That's right, for 10 years. You know Baker claims that their packers are for "permanent" installations, and I guess when a packer stands up for ten years with that differential across it that's "permanent" enough, and mighty good performance.

Operator: Sure sounds "permanent" enough for me. By the way, how many Baker Packers are in this field anyway?

Matthews: Well, I don't know exactly how many were set to start with, but there are 31 I can think of right off hand that were set in 1942 and are still operating perfectly.

Operator: Man, that's a lot of packers in one field like this. Will the new packer you just set in this well be good for another ten years?

Matthews: It will probably be good for 20 years, because it was the new "D-4" packer, and they should easily last twice as long.

Operator: What makes you think that?

Matthews: Well, there are a number of reasons. In the first place the packers set here in 1942 had the seal in the packer and it couldn't be repaired. With the new "D-4" the seals are on the Tubing Seal Nipple which is part of the tubing string, and when the seals need repairing you just pull the tubing, install new seals on the Baker Tubing Seal Nipple and run in again.

Operator: That sounds like a real improvement.

Matthews: Yes, it was, but that's just part of it. With wells getting deeper and both pressures and temperatures higher, the new Baker Packers have lead seals to back up the resilient packing element, and then we put in malleable iron rings to back up the lead seals. Our Engineering Department found that when things got really tough the resilient packing element wouldn't stand up by itself, and even the lead would give way sometimes under extreme conditions. So, we backed up the lead with malleable iron rings—and believe me, that did it.

Operator: Sounds like you *could* be right about that new packer lasting 20 years. But what about drilling out the packer if you have to go on the pump?

Matthews: No trouble at all. The new packer is just as drillable as the old type was, and operators around here know that *it* drills up easily because they've had to drill 'em when the wells finally quit and had to be put on the pump.

Operator: Well, I guess you're right about "permanent" installations. If a packer holds out until the well quits and you have to put her on the pump, that should be "permanent" enough to satisfy anybody.

•

The Baker Retainer Production Packer has so many other advantages besides being "permanent" that you ought to know all about it. You should know how it can be set on a wire line (as well as on tubing or drill pipe)—how it virtually becomes part of the casing, leaving the tubing free to be run or pulled as often as necessary—how you can produce two zones separately and simultaneously.

There's a new issue of Baker Equipment News on the subject of "Dual Zone Completion Practices" which is well worth your study. Ask any Baker representative or office for your copy.

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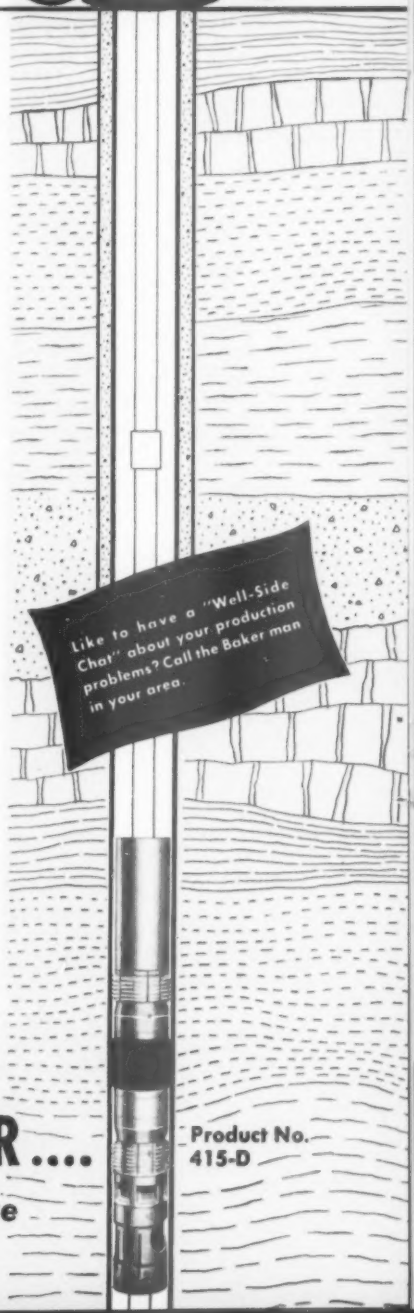

BAKER RETAINER PRODUCTION PACKER....

Product No. 415-D

Available through any Baker office or representative

There's a growing feeling that oil has turned a corner

A CONGRESSIONAL committee is currently considering legislation to place restrictions on imports of foreign oil, and a considerable portion of the domestic oil-producing industry is pressing for such restrictions.

But a great many other oil producers are opposing legislation at this time. This is not because they fail to realize the precarious position of the industry due to world-wide oversupply. There is general agreement that heavy imports are a major factor in the slowing down of producing and drilling activity and the high inventories in this country.

One reason why so many oil men refuse to join in the chorus that "there ought to be a law" is the matter of principle. Having fought federal regulation of their own operations for so many years, they are loath to ask regulation of competitors the minute the going gets a bit tough. They think the problem can be worked out within the industry and that there should be a lot more effort toward this before going to Congress.

FURTHERMORE, a feeling of optimism is spreading in a good many places within the industry, a feeling that the worst is over and that the corner has been turned.

It is hard to point to any specific facts to justify a sanguine attitude toward the supply situation. Inventories are still high, domestic production is still curtailed, and there is no big increase in demand. The reductions in imports voluntarily announced by a few of the big importers are little more than token cuts, and the importers' expressions of concern over the problem are a long way from firm commitments.

Nevertheless, during the past fortnight or so, a feeling of helplessness has changed to one of hopefulness in a significant number of industry leaders. There is faith that the big importers will not pull down the pillars of their own house by undermining the market structure of the domestic industry, and that ways will be found to create new markets for foreign oil or to adjust imports to market demand as domestic production is adjusted.

THIS is encouraging. It should not be dismissed as whistling near a graveyard. It reflects a confidence that the industry can put its own house in order and that it will do so.

Time may prove this confidence to be ill founded, but time should be allowed for a trial; for it takes time to make changes in world-wide supply and demand in petroleum. No disaster is likely to hit the industry during the next few months. A great many things remain to be tried before taking the distasteful and dangerous step of seeking federal regulation.

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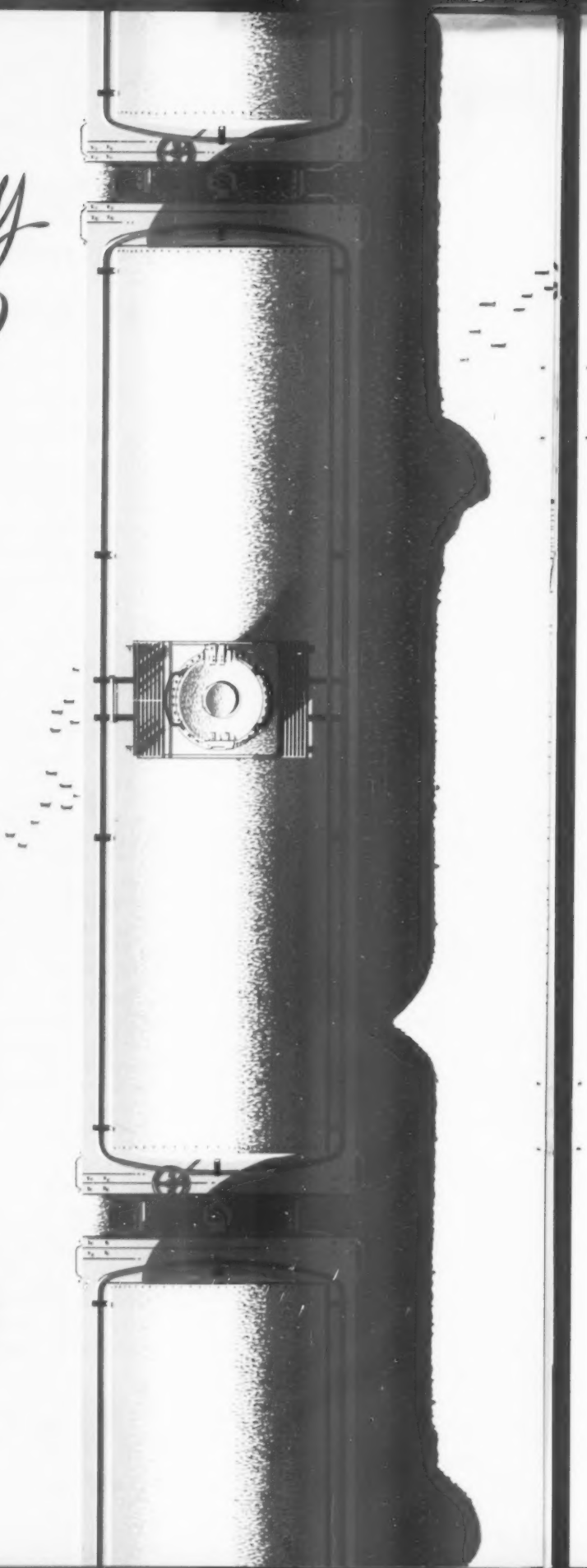

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THIS WEEK

IMPORTS.—Top administration officials urge House committee not to approve proposals that quota restrictions be placed on oil imports. . . . Industry officials representing opposite view expected to testify before group this week. . . . Interior Secretary McKay spearheads government appearances, declares this method of reducing imports not ideal, that industry, itself, is making adjustments. . . . ¶Study shows quotas would drastically cut production in Venezuela, possibly encourage group seeking nationalization, probably delay plans to grant new concessions. . . .

PIPE LINES.—New big-inch outlet for Spraberry gas included in huge $100,000,000 construction program approved by FPC involving installation of new transmission facilities by Permian Basin Pipeline Co., Northern Natural Gas Co., and El Paso Natural Gas Co. . . . ¶Biggest North American crude carrier, West Texas Gulf Pipe Line Co.'s line from West Texas to the Houston area on the Gulf Coast, set for dedication May 12. . . .

ACTIVITY.—Production of crude and lease condensate averaged 6,275,525 bbl. daily for week ended May 2, up 9,750 bbl. daily. . . . Total well completions of 980 for the week represented the high point since the week of August 9 last year. . . . Wildcat completions for the week were off 16 wells to 174. . . . Rotary rigs operating in United States gained 53 rigs during the week ended May 4 to 2,584. . . .

TRENDS.—Indicated demand on refineries for the four major products in the 5-week period ended May 2 was about 6 per cent greater than for the month of April last year. . . . Demand for refinery gasoline gained slightly less than 4 per cent. . . . Cooler weather in April resulted in a gain of over 11 per cent for kerosine and distillate fuels. . . .

REFINING.—International Refineries, Inc., places new 11,500-bbl. refinery on stream at Wrenshall, near Duluth. . . . Refinery charging Canadian crude. . . . ¶Pan American Refining Corp. announces it is studying three sites for a proposed 25,000-bbl. refinery on the East Coast. . . . Sites are in Rhode Island, New Jersey, and Maryland, company says. . . . Refinery would be third announced in past 2 years for East Coast. . . . Previous announcements have been made by Sheil and Esso Standard. . . .

INTERNATIONAL.—Iran seeks to increase its oil trade with Japan, but in the Far East, fears that such a move would endanger important trade ties with Britain indicated that Japan would be slow to antagonize the British. . . . ¶Max Ball reported to have taken position as adviser to Turkey in planning new petroleum policy expected to encourage entry of foreign oil capital. . . . ¶Basrah Petroleum announces it expects to complete 24-in. crude line from Zubair field to Fao tanker terminal in October. . . . ¶Egyptian Government promulgates new oil law eliminating the Egyptian company requirement but retaining another highly objectionable provision in regard to pricing of products. . . . Oil activity in country not expected to resume until this provision is removed. . . .

GOVERNMENT.—Senate passes Holland bill restoring to coastal states the submerged lands within their seaward boundaries. . . . Measure passes by vote of 56 to 35. . . . All amendments to weaken legislation decisively rejected. . . . Senate and House expected to act quickly on compromise bill. . . . ¶Texas Supreme Court refuses to review Appeals Court decision upholding Texas' controversial natural-gas-gathering tax. . . . Attorneys for companies indicate Supreme Court will be asked to rehear the case. . . .

BIGGEST OIL-FIELD WORKER in the world is this 65-ft. monument to the industry's men on the rig floor. The gilded statue, shown here being lifted in position by two 75-ft. cranes, will stand in front of the Unit Rig & Equipment Co. exhibit at the International Petroleum Exposition, which opens in Tulsa Thursday. The unnamed worker will hold a gold-colored line running from the drum of the five-hundredth Model U-115 rig produced by the company. (Photo courtesy Tulsa Daily World.)

LOOKING NORTHEAST across the International Petroleum Exposition grounds a week before opening day of the huge oil show. At lower left is the big Hall of Science building. Long buildings framing the center of the grounds are permanent exposition buildings which will house most of the booth exhibits. Exhibitor-owned structures dot the remaining area. Five derricks may be seen in this photograph, and others arrived shortly after this picture was taken. Construction work, interior decorating, and movement of exhibits was in full swing as this picture was snapped. Note rail cars in foreground which brought in some of the larger exhibits.

Oil Show to Open

First of an expected 500,000 visitors to enter I.P.E. grounds Thursday morning to see latest in oil equipment

TULSA. — Petroleum-industry equipment and machinery valued at more than $100,000,000 will go on display here Thursday, May 14, as the gates open to an expected record number of visitors attending the thirtieth-anniversary International Petroleum Exposition.

Charlton H. Lyons, president of the Independent Petroleum Association of America, will extend the I.P.E.'s official welcome in a brief address expected to be heard on the grounds by 5,000 exhibitors, oil men, and the curious from the non-oil public.

The exposition's 28-acre grounds was a beehive of activity at week's end as exhibitors moved equipment and displays into position in the huge permanent exposition buildings and into outside display areas and other buildings owned by exhibitors.

Nine rigs already were on the grounds and others were expected to be erected before the official opening of the 10-day oil show, one of the world's biggest industrial displays. The rigs on hand ranged from those capable of deep drilling operations through highly mobile masts, slim-hole rigs, and a variety of spudders.

Represented at the oil show will be a total of 1,484 exhibitors, featuring everything new in oil-field equipment, supplies, and services. Exposition officials have announced they expect 500,000 persons to enter the gates during the 10 days the show is in progress.

One of last week's most spectacular developments was the erection of a 65-ft. papier-mache statue of an oil-field worker, built for Unit Rig & Equipment Co. The statue, built around a wire-mesh frame supported by a utility pole, was lifted into position by two 75-ft. cranes.

A record number of oil men and government representatives from abroad also are expected to visit the oil show to get a first-hand view of the latest developments in equipment and drilling, production, and refining techniques. I.P.E. officials are making plans to receive 600 visitors from 45 or more foreign countries.

To Contact Friends...

...At the International Petroleum Exposition, merely call one of the phone numbers listed below. The Oil and Gas Journal will operate a message clearing house, with a special telephone switchboard and messengers for your convenience in contacting your business associates or friends on the exposition grounds.

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Clinic for Oil Men

Journal will offer reading tests during oil exposition

TULSA.—The Oil and Gas Journal at its building in the center of the International Petroleum Exposition grounds will have special equipment and personnel available for all visitors to participate in "Improve Your Reading" tests.

Reading tests will be given to oil men at the exposition who wish to test and further their reading ability—for engineering reports, business letters, inter-

ANY KIND of reading material can be put in one of these "reading accelerators," which are housed with a shutter which automatically moves down the page, forcing the reader to keep his reading speed up to a preset, constant level. Here Prof. Loris De Figh, of the University of Tulsa's reading clinic, gives slide-rule results to two petroleum-engineering students.

OPERATING a tachistoscope (flash meter), Prof. De Figh determines how quickly the two observers can recognize a set of numbers or phrases. The flash meter projects numbers and phrases on the screen in predetermined rates up to one-hundredth of a second, which is the approximate closing time of the eyelid.

University of Tulsa Reading-Clinic Results

	February 1953			April 1953		
Reader	Rate*	Comp.†	RES‡	Rate	Comp.	RES
A	229	75%	172	450	92%	414
B	285	60	171	425	92	391
C	252	76	192	400	95	380
D	200	60	120	400	100	400
E	173	68	118	441	76	335
F	223	76	170	425	92	391

*Words per minute
†Comprehension
‡Reading Efficiency Score (Rate x Comp./100)

office memoranda, business magazines, etc.

Testing will be handled by personnel of the University of Tulsa's reading clinic (a J. E. and L. E. Mabee foundation), supervised by Prof. Loris De Figh.

It has somewhat suddenly dawned on alert management that a very considerable part of higher-level personnel efficiency rests upon how fast they can read, and the proven fact that greater speed in reading can fairly readily be taught.

"Better reading" is now a movement of considerable magnitude among industrial organizations and technical personnel. So far it has had its principal impetus in the eastern United States, where a number of large oil companies and other industrial concerns have arranged special courses to improve the reading habits and speeds and comprehension of their executives and key personnel. Results of many of these reading schools have been remarkable—reading rates doubled or more, and reading comprehension significantly improved.

A spokesman for one company put it this way: "Consider the business executive who reads 4½ hours a day, the average. A 100 per cent improvement in reading would free 2¼ hours a day for other activity. Based on average working day, the increase in productivity would amount to 25 per cent. Thus the pioneering on productivity increase through better reading is of the highest significance."

Some results of one group trained on the reading machines (see pictures) at the University of Tulsa, achieved improvements shown in the accompanying table.

Next week's Journal will have three short but interesting articles on this subject, the titles being (1) "Executives Get Basic Training . . . In Reading for Profit," (2) "Speed Up Your Reading," (3) "Aid to Executive Development . . . Reading Business Magazines for Profit."

Progress in Analysis

New analytical methods described at meeting of A.P.I.'s Division of Refining show added sensitivity and accuracy

George Weber

NEW YORK.—A record participation of United States refiners is expected here this week as the American Petroleum Institute's Division of Refining opens its eighteenth annual midyear meeting. Eleven technical sessions on processing, research, corrosion, equipment and product characteristics, together with 33 key committee meetings will be compressed into the four-day period.

Meeting in New York for the first time, the division anticipates an attendance of over 1,000 according to API Vice President for Refining John W. Newton of Magnolia Petroleum Co. Under the general direction of the program committee headed by Charles M. Ridgeway of Pure Oil Co., a balanced agenda including several papers of prime importance, will attract technical and administrative men in all branches of refining. Papers will cover three original reports on new refining processes, new light on motor fuel and lubricating oil service, and added findings concerning corrosion. The opening day is devoted to progress reports on analytical research and studies of metal deterioration, to be covered in this preliminary report.

Analysis of trace elements . . . Added evidence of the importance of trace elements occuring in crude oil has directed new emphasis to determination of such

contaminants and evaluation of their effects on product characteristics.

Two timely papers shedding new light on this subject will be presented in the opening session of the meeting. C. W. Key and D. G. Hoggan of Richfield Oil Corp., Wilmington, Calif. outline a new direct spectrographic method which analyzes fuel oils for such trace elements with new speed and accuracy. Sodium, vanadium, nickel, and calcium can be measured in concentrations of a few parts per million in a matter of minutes.

The Richfield technique employs a graphite-disk electrode which is rotated through the sample to be analyzed, introducing a film of oil into a high-voltage electrical discharge in the spectrograph. The positions and intensities of the dark spectral lines recorded on a 35-mm. film permit qualitative and quantitative analysis in a small fraction of the time required by older methods.

Since these trace elements can become concentrated in certain streams during processing, they often critically affect product quality. A good example is the presence of vanadium in heavy fuel oil which limits its use as a gas turbine fuel, a product with which Richfield has had considerable experience. In such cases, precise analysis must be made at frequent intervals and the new method overcomes the handicap of former methods which could not be made rapidly enough to be of maximum benefit.

The entire field of petroleum residue analysis is reviewed in three papers by G. V. Dryoff, John Hansen, and C. R. Hodgkins of Standard Oil Development Co. The authors review the many semimicro and spectrochemical methods for analyzing petroleum ash for such elements as nickel, iron, vanadium and sodium, and evaluate them as to cost, ease of operation, precision and accuracy. They show how statistical treatments afford a method of determining the variables of different methods, a measure of the accuracy and precision to be expected of a given method, and a means of comparing methods.

Test-procedure evaluations . . . Many refiners have devoted recent studies to the standardization and improvement of product inspection tests in control laboratories. Research representatives of Imperial Oil, Ltd., and Standard Oil Development Co. present a paper on such a study conducted by laboratories affiliated with Standard Oil Co. (N. J.). The accepted method is to analyze statistically the results obtained in several labs from testing identical product samples under normal conditions. This study reveals which labs, if any, may be out of line and incites their improvement to conform to a high overall standard for routine testing accuracy.

This same approach to research analytical tests is outlined in another paper by research men of the same company group. Their joint report shows how test procedures can be evaluated using statistical techniques. A round-robin exchange of samples was conducted among several laboratories, each one testing each sample three times on different days. The tabulated data were first "combed" for "wild" results which served to pinpoint those labs which needed help in improving their methods.

The remaining good data were then analyzed statistically to obtain a working estimate of the repeatability (ability to check results within one lab) and the reproducibility (ability to check results between different labs) of the test method. The result was a measure of the test's dependability, and the program has aided the affiliated laboratories to standardize on test procedures for research analysis.

Research committees active . . . Evidence of the widespread work being conducted under the direction of the Refining Division's Committee on Analytical Research, is shown in papers reporting progress by two subcommittees.

As a result of the cooperative efforts of several petroleum laboratories coordinated by the subcommittee on analysis of oxygenated compounds, that group reports that oxygen can now be accurately and precisely analyzed in concentrations as low as 100 parts per million. Vastly improved procedures have come out of the 6-year investigation, and the work also stands as a major contribution to other industries since the new methods apply to practically any organic compound. The improved procedures furthermore, require only few milligrams of sample for analysis which augments their usefulness.

New waste-control tools . . . Increased vigilance concerning waste water is possible as a result of the work of the subcommittee on refinery effluent-water analytical methods.

The same pattern of cooperation between committee and industry laboratories has developed new methods which will identify as little as a few parts of oil in a billion parts of water. The group presents a progress report on "Methods for Determining Hydrocarbons and Phenols in Refinery Effluent Waters" which will serve as a valuable reference in the progressive drive toward reducing contaminants harmful to living organisms in rivers and streams.

Another contribution to pollution abatement is a mass-spectrometer method for determination of volatile contaminints in water, reported by a research team from Atlantic Refining Co. including F. W. Melpolder, C. W. Warfield, and C. E. Headington, who also heads the Refining Division's over-all Committee on Analytical Research. This sensitive test will identify gasoline, kerosine, or furnace oil in concentrations as low as one part per billion. Moreover, the test will tell whether the contaminant originates from petroleum or some other source.

Graphitization studies . . . Progress is reported on the study of steel graphitization, which came sharply to the industry's attention 2 years ago when it contributed to the failure of cat cracking reactor vessels.

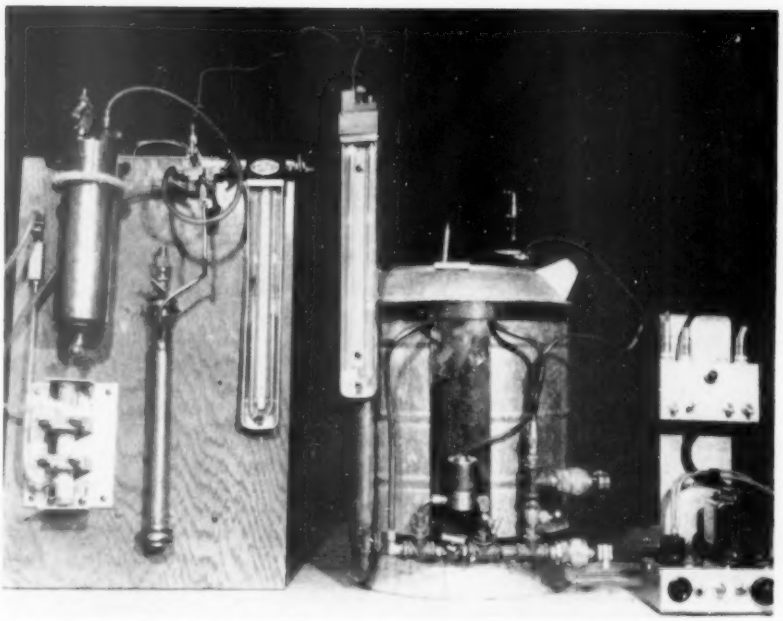
Here again the institute serves the industry through a committee which is coordinating efforts with similar groups representing other associations. The A.P.I.-sponsored investigation by Battelle Memorial Institute is progressing on three objectives: to determine the present extent of graphitization in equipment, to estimate its future course in graphitized and ungraphitized equipment, and to collect information with which to assess the feasibility of specifying plain-carbon steels satisfactorily resistant to graphitization.

Battelle reports that of 90 samples from refinery equipment thus far examined, 31 graphitized. Of these, 22 had graphitized to a slight extent while in 2 cases, graphite had concentrated at weld-heat-affected zones to an extent sufficient to cause cracking in a cold-bend test.

An accelerated graphitization test was made on 65 samples. Among these were 10 which showed susceptibility toward graphitization, although no graphite had been found in them as they were removed from the refinery equipment. However, in some cases the authors report average service temperature was low enough that graphitization would not be expected even in a susceptible steel.

More data will be required for full evaluation of the effect of steel-making practice on graphitization susceptibility. To date, those cases showing severe graphitization occurred in "high aluminum" deoxidized steels made to A.S.T.M. Specification A 201. None of the carbon-molybdenum steels examined showed any graphitization either as received, or after the accelerated test, the authors report.

J. J. Kanter, of Crane Co. in his paper on "Segregated Graphite in Steel" states that segregation appears to be related to localization of plastic strain, and that graphitization only leads to loss of ductility when the factors determining segregation are active. Hence, inspection for graphitization must evaluate the ductility loss rather than the mere presence of graphite.



ABSORPTION INDEX is determined through use of above apparatus consisting of equilibrium cell (left), constant temperature bath (center), and control unit (right).

New Testing Method

Phillips technologists describe simplified testing method which predicts butane-and-heavier contents of natural gas

F. Lawrence Resen

HOUSTON. — A new simplified method for testing natural gas was presented to the thirty-second annual convention of Natural Gasoline Association of America by T. W. Legatski, J. W. Tooke, and L. A. Grundy, of Phillips Petroleum Co.

Legatski noted that the method—termed Absorption Index Test—may be used to predict the "butane and heavier" content of a natural gas with a precision of 5 per cent based on fractional analysis.

The test consists of measuring the equilibrium pressure developed when a sample of 40 volumes of gas is mixed with one volume of pure normal octane at 760 mm. mercury initial pressure and 100° F. Gas is placed in an equilibrium cell which is then placed in a temperature bath. After its pressure has been adjusted, a measured amount of solvent is added and the pressure allowed to stabilize by keeping the bomb in the temperature bath and shaking it intermittently.

The final reading on the manometer, after pressure has become steady, is used to determine the richness of the gas. Very lean gases cause the final reading on the manometer to be about one atmosphere or slightly higher, while richer gases give final readings of less than one atmosphere.

Legatski said the method was devised to overcome several objectionable features of usual analytical methods such as cost, time consumption, and need for a well-equipped central laboratory. The objective was to develop a simple test, the results of which would correlate reasonably well with composition and where some sacrifice in absolute accuracy could be tolerated in the interests of speed, cost, and convenience.

Since primary concern was with heavy fractions of natural gas, a satisfactory test method had to be sensitive to variations in the content of higher molecular weight compounds, he said. It was reasoned that if a measured quantity of a reproducible pure hydrocarbon solvent could be brought into contact with a measured quantity of the sample gas confined in a chamber under standard conditions, the resultant final pressure on the system could be related to the concentration of the readily condensible hydrocarbon fractions present in the gas.

Using this lead, and as a result of a series of preliminary calculations using

OFFICERS AND DIRECTORS of the Natural Gasoline Supply Men's Association were photographed at a directors' meeting during the recent annual meeting in Houston of the Natural Gasoline Association of America. Seated, left to right, are M. W. Conn, Perco Division of Phillips Petroleum Co., Bartlesville, Okla., treasurer; H. M. Anderson, Tellepsen Construction Co., Houston, second vice president; M. A. Ellsworth, Fluor Corp., Ltd., Los Angeles, president; M. E. Duncan, Johns-Manville Sales Corp., Tulsa, retiring president; and C. C. Clover, Westcott & Greis, Inc., Tulsa, first vice president. Standing are W. F. Hildebrand, General Electric Corp., Tulsa, representing E. C. Wise; Ray F. Riddle, Riddle & Hubbell, Tulsa; A. F. Canada, Jr., Pacific Pump Co., Inc., Tulsa; Dallas F. Deem, American Air Filter, Inc., Tulsa, retiring board adviser; Joe L. Parker, Girdler Corp., Tulsa; M. H. Kotzebue, Gasoline Plant Construction Corp., Houston; Jimmy Dvoracek, Black, Sivalls & Bryson, Tulsa; Roy Bush, Nordstrom Valve Division of Rockwell Manufacturing Co., Tulsa; and William F. Lowe, secretary of N.G.S.M.A. and secretary-treasurer of N.G.A.A.

NATURAL GASOLINE Association of America officers photographed following the election at the thirty-second annual meeting of the association in Houston. Seated, left to right, are John Lynch, La Gloria Corp., Corpus Christi, retiring president; Frank M. Perry, Cities Service Oil Co., Bartlesville, new president; and G. T. Tennison, Shell Oil Co., Houston, vice president. Standing are Albert H. Weil, United Gas Pipe Line Co., Shreveport, vice president, and Robert Boykin, Fullerton Oil Co., Pasadena, Calif., vice president. Not present for the picture was W. F. Matheny, Sid Richardson Gasoline Co., Fort Worth, vice president.

various pure hydrocarbon solvents and a wide range of hypothetical gas compositions, it was concluded that a promising solvent was normal octane, and that a promising ratio of gas to solvent was 40 to 1 for a contacting temperature of 100° F. and an initial gas pressure at 100° F. of 760 mm., he said. For these conditions the final pressure on the system would range from about 12 psi. absolute to about atmospheric depending upon the composition of the gas under test. The approximately 3 psi. difference in final pressure would roughly correspond to a change of 20 mol per cent in the "butanes and heavier" content.

The absorption index test was run on 34 samples, with a sample of the gas later analyzed by low-temperature fractional analysis. The samples represented a wide variety of gases being obtained from Osage County, Oklahoma; Panhandle field near Pampa, Tex.; the Permian basin around Odessa, Tex.; and Chocolate Bayou field, Brazoria County, Texas.

The pentanes and heavier contents range from about 0.3 mol per cent to almost 12.0 mol per cent. Nitrogen contents varied from less than 1 per cent to nearly 25 per cent. Some of the samples were taken from oil wells, some from gas wells and others from gas-condensate wells, with the Permian basin gases being generally sour and the others generally sweet. A deliberate effort was made to obtain extremes in hydrocarbon composition and nitrogen content Legatski said.

In correlating the results of the test on all of these samples it was found that with few exceptions all samples fell within + or — 5 per cent of perfect agreement with the fractional analysis tests, he said.

Butane Oversupply

New markets will be needed in future, N.G.A.A. told

HOUSTON.—In coming years the butane supply will be greater than the amounts needed in gasoline and the quantities which can be sold profitably as liquefied petroleum gases.

The indicated surplus is so large that industry will need to develop outlets peculiarly favorably to the C_4 hydrocarbons, members attending the thirty-second convention of Natural Gasoline Association of America were told.

In a paper presented by D. P. Barnard and prepared jointly with J. H. Forrester and R. A. Steel, all of Standard Oil Co. (Ind.), the discussion pinpointing the light ends situation on January 1, 1955, brought out the following points:

. . . New refining capacity to be installed during 1953 and 1954 will result in a negligible increase in gasoline front-end volatility as measured by per cent evaporated at 158° F.

. . . Increase in refinery butane production during this above period may exceed the increase in consumption of butane by as much as 12,000 bbl. per day, depending on the increase in use of natural gasoline.

. . . The refiner will not require any additional butane from the natural-gas industry. In fact, the refining industry may be expected to either reduce current purchases or go into competition with the natural-gas industry for L.P.G. sales.

. . . The ability to incorporate all available pentane - and - heavier hydrocarbons into gasoline will not be affected. However, increasing casinghead production will in all probability face competition from low-cost incremental motor-gasoline which the refiner will be able to produce with his excess refining capacity.

The report also noted that large quantities of butane are available for recovery if a market could be found and that these quantities are going to increase in the next few years.

Gasoline Use Up

All-time peak reached in 1952, A.P.I. study shows

GASOLINE consumption in the United States reached the all-time peak of 46,437,000,000 gal. in 1952, according to the revised state tabulation by the American Petroleum Institute.

The new record represents a gain of 2,548,000,000 gal. or 5.8 per cent over consumption in 1951.

California continued as the leading state with a total of 4.49 billion gallons, followed by Texas and New York with 3.93 billion and 2.94 billion gallons respectively.

Some over a billion . . . A total of 16 states reported consumption of a billion gallons or more in 1952. These states accounted for 31.4 billion gallons or 67.6 per cent of the national total. However, the increase over 1951 for these states was only 1.6 billion gallons or 62.8 per cent of the total gain. The gain over 1951 for the 16 states was 5.4 per cent compared with the increase of 5.8 per cent for all states.

There were four states with gains larger than 10 per cent, and only one out of the four, Texas, was in the group of 16 large-demand states. The other states with increases greater than 10 per cent were: Arizona with a gain of 17.3 per cent, New Mexico with 12.5 per cent, and South Carolina with 11.6 per cent.

Texas had the largest volumetric gain in 1952, up almost 420 million gallons. The smallest volumetric gain was for the District of Columbia.

Every state reported more gasoline consumed in 1952 than in 1951.

GASOLINE CONSUMPTION IN THE UNITED STATES*

(Thousands of gallons)

	1952	Increase over 1951
Alabama	685,486	40,248
Arizona	314,350	46,363
Arkansas	448,207	23,197
California	4,487,131	96,974
Colorado	525,684	32,771
Connecticut	573,906	31,986
Delaware	117,325	8,524
District of Columbia	207,617	1,341
Florida	1,057,776	93,658
Georgia	927,151	73,469
Idaho	220,490	10,268
Illinois	2,445,212	69,534
Indiana	1,393,038	83,503
Iowa	1,006,271	30,311
Kansas	831,535	45,180
Kentucky	656,183	40,969
Louisiana	651,426	50,721
Maine	252,601	12,425
Maryland	644,755	58,195
Massachusetts	1,042,582	19,213
Michigan	2,129,577	49,112
Minnesota	1,003,968	57,751
Mississippi	498,665	26,526
Missouri	1,359,819	94,029
Montana	249,632	17,259
Nebraska	513,327	24,017
Nevada	95,918	4,278
New Hampshire	143,844	5,135
New Jersey	1,487,170	90,459
New Mexico	282,273	31,417
New York	2,941,456	153,786
North Carolina	1,084,672	71,430
North Dakota	279,159	8,941
Ohio	2,463,122	112,055
Oklahoma	793,402	50,322
Oregon	568,257	21,356
Pennsylvania	2,480,338	109,410
Rhode Island	188,748	6,106
South Carolina	581,024	60,273
South Dakota	296,467	9,117
Tennessee	830,198	60,447
Texas	3,933,866	419,793
Utah	239,221	13,468
Vermont	106,885	6,241
Virginia	997,342	77,918
Washington	759,398	28,008
West Virginia	407,574	14,074
Wisconsin	1,084,252	49,034
Wyoming	148,725	7,686
Total U. S.	46,437,025	2,548,298
Total U. S. (thousands of gal. daily)	126,877	6,963

*American Petroleum Institute.

Dartmouth Ceremony Set

HANOVER, N. H.—The 100th anniversary of the first scientific analysis of crude oil will be observed in ceremonies on the Dartmouth College campus here June 26.

The analysis was made by two Dartmouth professors, Dr. Dixi Crosby and Oliver B. Hubbard, in 1853. They reported that the liquid contained useful and potentially valuable properties but doubted that it would ever be economically important because it could not be obtained in commercial quantities.

Their findings, however, led to the formation of the world's first oil company and eventually to the drilling of the first oil well at Titusville, Pa.

A tablet commemorating the examination will be unveiled at Crosby Hall. Douglas McKay, Secretary of the Interior, is expected to speak at a memorial dinner, at which Col. J. F. Drake, until recently chairman of the board of Gulf Oil Corp., will be toastmaster.

OFFICIALS AND SPEAKERS at A.G.A.'s transmission and storage conference in Chicago includes (left to right): Walter H. Davidson, general superintendent of Transcontinental Gas Pipe Line Corp., Houston, chairman of the program committee of conference; F. A. Hough, vice president of Southern Counties Gas Co., Los Angeles, chairman of the subcommittee for pressure piping; W. E. Ferguson, vice president, Ohio Fuel Gas Co., Columbus; and William M. Deaton, helium engineer, U. S. Bureau of Mines, Amarillo, Tex.

Embrittlement Problem

Causes being studied by A.G.A. body preparing piping code; new developments highlight transmission conference

Paul Reed

CHICAGO. — The first transmission and storage conference was held here April 30 and May 1 at the Edgewater Beach Hotel for the new program of the American Gas Association, featuring technical discussions of natural-gas problems. Natural gas has now displaced manufactured gas to such an extent that 94 per cent of all gas sold is natural gas, according to J. T. Innis, Northern Natural Gas Co., chairman of pipe-line-research committee. Natural gas is an $8,000,000,000 industry.

Gain in Gas-Line Mileage

There are more than 342,450 miles of natural-gas lines in field, gathering, transmission and distribution service in the United States, said Frank C. Smith, Houston Natural Gas Co., president of the American Gas Association. Of these, 145,420 miles have been built in the last 10 years for transmitting 8.6 trillion cubic feet annually from reserves of 199.7 trillion cubic feet.

Most of the papers at the conference were closely related to the A.G.A. research program.

Embrittlement problem . . . In the preparation of the piping code, attention is being given to the problems of steel embrittlement, according to F. A. Hough, Southern Counties Gas Co. and chairman of subcommittee No. 8 on gas-transmission and distribution piping of the sectional committee on code for pressure piping, American Standards Association B31. Scratches, grooves and cracks produce stresses that are important factors in causing embrittlement.

Unfortunately, 0.25 per cent carbon steel may be brittle at normal temperatures as the result of a notch or any type of mechanical discontinuity, whether it be part of the structural design or an inadvertent discontinuity such as imperfections in a weld, said Prof. Earl R. Parker of University of California. Brittle fractures may propagate at velocities approaching a mile per second.

An electrical hygrometer has been developed by the U. S. Bureau of Mines which will be useful in the automatic control of the water dew point of gas sent from plants. W. M. Deaton, helium engineer of the bureau reported that this instrument for the measurement of

water vapor in natural gas is rugged, requires little attention, and can be easily checked.

A research project being conducted near Refugio, Tex., to determine whether the basic orifice coefficient data in the A.G.A. gas-measurement report No. 2 can be extrapolated for measuring gas accurately through large diameter meter tubes, was described by E. E. Stovall, Lone Star Gas Co. Better metering of large diameter long transmission lines will aid in determining when cleaning and pigging are needed to restore pipe line efficiency. *(A detailed article on this subject appeared in The Journal, issue of July 28, 1952, page 288).*

There is no loss of gas in underground storage until it comes to the surface. Gas in storage may be accurately computed, said W. E. Ferguson, Ohio Fuel Gas Co. However, deliverability is not directly proportional to stored volume throughout the output cycle. A company in West Virginia reported that it has recovered 130,000 bbl. of crude oil over a period of 10 years as a byproduct of its underground gas storage program.

Savings achieved by cathodic protection were cited by a gas company which avoided expenditure of over $100,000 for line replacement under city streets by application of cathodic protection with a single magnesium anode costing less than $10.00.

Engines and compressors . . . Several new types of compressor units were informally discussed. A turbo-charged 2-cycle gas engine for driving a reciprocating compressor has been tested recently with fuel consumption of 7,000 B.t.u. per horsepower hour as compared with 8,000 B.t.u. for conventional units.

Still lower fuel consumption of 6,600 B.t.u. per horsepower hour is achieved by an improved engine operating at 3,700 r.p.m. A new type of unit consists of two engines side by side operating at 750 r.p.m. for driving a centrifugal compressor at 3,600 to 3,700 r.p.m. with a five-to-one gear. A new type of unit is considered which would operate with a gas-engine-driven air-compressor furnishing compressed air for driving an expansion turbine direct-connected to a centrifugal compressor.

The advantage of dual-shaft design for gas turbines were cited by F. O. Hennig, Clark Bros. Co. A gas turbine of 5,250 hp. operating with ambient temperature of 80° F. at 1,000 ft. elevation, with turbine inlet temperature of 1,350° F. has guaranteed shaft thermal efficiency of 25 per cent.

The A.G.A. was presented with an award by the U. S. Department of the Interior for effective gas conservation.

New Research Laboratory Opened

Dowell Incorporated has opened this new chemical laboratory at its Tulsa headquarters to conduct research into chemical problems of oil-well treating and servicing. The new building contains 9,000 sq. ft. of floor space and is adjacent to the company's engineering and electronic laboratories and manufacturing and service shops.

Gas-Storage Report

Tremendous growth since 1944 cited by A.G.A. committee; capacity on January 1 totaled 1.3 trillion cubic feet

CHICAGO.—Ultimate capacity of existing underground natural-gas storage pools at the end of 1952 was almost 1.3 trillion cubic feet, according to a report by the American Gas Association committee on underground storage at the transmission and storage conference in Chicago on May 1.

There were 151 underground storage pools in 15 states at the end of 1952 compared with an estimated 50 pools in 11 states in 1944. Ultimate capacity of existing pools in 1944 was about 135 billion cubic feet or only slightly more than one-tenth of the capacity at the end of 1952.

Capacity was expanded by 374 billion cubic feet or 40.8 per cent during 1952. When work is completed on the 17 pools now under way, ultimate capacity will be raised by an additional 22 per cent, bringing the total to 1,574 billion cubic feet.

The maximum in storage at any time during 1952 was 777 billion cubic feet, according to the committee's report. Total input to storage in the year ended October 31, 1952, was 374 billion cubic feet, compared with withdrawals of 235 billion for the same period. The difference of almost 140 billion cubic feet reflects the growth in total storage capacity as well as the influence of mild weather during the winter of 1951-52.

Pools located in the Appalachian

UNDERGROUND GAS STORAGE
(Volumes in millions of cubic feet at 14.65 psi., 60° F.)

State—	No. of pools	No. of active wells	No. of compressor stations	Maximum gas in storage	Ultimate reservoir capacity	No. new pools under const.
Arkansas	2	16	1	2,251	5,060	
California	3	35	3	15,943	55,783	
Illinois						1
Indiana	3	63	2	1,380	10,340	
Kansas	12	380	6	36,309	38,011	4
Kentucky	4	202	3	17,755	24,748	
Michigan	11	747	2	133,214	223,181	
Montana	1	54	2	9,722	40,017	
New Mexico	4	43	2	21,545	68,259	
New York	14	276	10	23,438	29,067	
Ohio	10	1,392	9	144,587	215,484	
Oklahoma	4	47	2	51,091	87,970	
Pennsylvania	55	1,281	35	181,837	300,251	3
Texas	2	8	1	2,080	6,800	3
West Virginia	24	388	17	129,389	165,478	6
Wyoming	2	8	2	6,462	21,872	
Total	151	4,940	97	777,003	1,292,321	17

and North Central states accounted for 969 billion cubic feet or 75 per cent of total capacity at the end of 1952.

Almost one-fourth of the total capacity was located in Pennsylvania, and this state accounted for more than one-third of the pools. Michigan ranked second on a capacity basis, followed in order by Ohio and West Virginia. Also, six of the pools under way at the end of the year were reported for West Virginia.

Maximum daily withdrawal from storage in the year ended October 31, 1952, was 4.1 billion cubic feet compared with 3.2 billion for the preceding year.

New Source of Gas?

Coal mines yield marketable natural gas in Belgium, and Britain is now trying out the newly developed technique

Paul Reed

CHICAGO.—Gas is being produced commercially from coal mines in England and Belgium by a novel technique which might prove to have some application to coal areas in the eastern United States.

D. L. Copp, deputy distributing engineer, North Thames Gas Board, London, England, who has been attending the American Gas Association's transmission conference here, said the practice has been applied at British mines during the past 18 months with the application of methods developed in Belgium for the past 3 years.

Andre Weiler, chief engineer of Distrigaz (Societe de Distribution du Gaz) Brussels, Belgium, also attending the A.G.A. meeting, reported that his company transmits 7,000,000 cu. ft. of gas daily from 25 coal mines. He gave the following information regarding the new Belgian technique.

Gas was first piped from coal mines in Belgium 3 years ago as a safety measure. The deeper the coal mines, the more serious is the problem of coal gas removal. In some cases, deep mining operations had to be indefinitely suspended before the adoption of the new practice of piping gas to the surface. Belgian coal mines at 3,600-ft. depths are regarded as the deepest coal operations in the world.

How it's done . . . In the mines, slanting holes of 2 to 3-in. diameter are drilled at an agle of 45° through the roof of the horizontal tunnel or "overhand stope," for distances of 300 to 450 ft. Such drilling is done soon after the stope has been dug and while the coal above the stope is beginning to crack.

During the next few weeks when the cracking of the coal above is proceeding at a fair rate, coal gas is pumped through pipe of 5 to 9-in. diameter to a compressor installation on the surface which pulls a vacuum. Two to five of these borings per month are drilled along the stope in the direction toward active mining operations. When cracking of the coal declines within a few weeks, the flow of coal gas ceases. Borings are then plugged with cement and drilling operations are continued forward at new locations further along in the stope.

Calorific values are closely watched and gas-extraction operations are automatically shut down to prevent explosions before reaching critical mixtures of air and gas.

Mining of coal goes ahead without serious interruption from operations for boring and for piping the gas to the surface. It has been suggested that the effectiveness of coal-gas extraction might be increased by inducing more extensive cracking of the coal by methods similar to Hydrafrac in oil and gas wells.

At the surface, coal gas is pumped by small rotary compressors, mostly of American manufacture.

Expansion plans . . . So far, coal gas is piped from only 25 of the 90 mines in Belgium. There are 10 other mines with booster stations and underground piping which produce about 1,800,000 cu. ft. daily. But this gas is not transmitted beyond the mines.

Coal-gas production may be increased perhaps only 25 to 50 per cent in Belgium in the near future. In England, it is predicted that there may be large expansion of coal-gas operations to a point where it may be an important source of fuel.

ERLE P. HALLIBURTON, center, chairman of the board of directors of Halliburton Oil Well Cementing Co., Duncan, Okla., is shown with A. E. Chester, Dallas, left, vice president of Magnolia Petroleum Co.; and Art Olson, Olson Drilling Co., Tulsa, during ceremonies in Duncan last week when the city observed "Erle P. Halliburton Day."

E. P. Halliburton Honored at Duncan

Kenneth B. Barnes

DUNCAN, Okla.—Three-hundred oil men from throughout the United States met here May 1 for "Erle P. Halliburton Day," held in honor of the founder and board chairman of Halliburton Oil Well Cementing Co.

They honored a mechanical wizard whose oil well-drilling and completion inventions and industrial ventures helped change the Southwest and affected the oil industry. Halliburton was presented a bronze bust of himself by the Duncan Chamber of Commerce.

Duncan is headquarters for Halliburton Oil Well Cementing Co., founded and headed by Erle P. Halliburton, with 6,000 employes in oil fields around the world. The 60-year-old inventor moved to Duncan in 1921 with about 10 employes helping him cement oil wells. Today, Halliburton Oil Well Cementing Co. has one-fourth of its personnel located at Duncan.

Halliburton was born on a Tennessee farm and his formal education ended at 14. Today he produces cement from oyster shells, mines gold in Honduras, manufactures aluminum luggage, makes special equipment for the U. S. Navy, has extensive real estate holdings in California, and is an independent oil producer in several states.

LINE-TYPE INJECTION PATTERN proposed by SACROC engineers for water and gas injection in Kelly-Snyder field of West Texas. Three triangles at north end of field represent gas-injection wells. Five wells at southern end of unit are designed to provide a "wall of water" between the SACROC flood and Lion Oil Co.'s unit operation in Diamond M field. The SACROC injection wells shown here are located on the crest of a ridge in the Canyon Reef formation, providing a maximum interval for water injection. Adoption of this pattern for secondary-recovery operations in the field hinges on approval by the Texas Railroad Commission of changes in the field rules proposed by SACROC.

Water-Flood Offer

In unique documents, 18 SACROC firms tell nonsigners they will reimburse them for any losses due to injection

Ted A. Armstrong

FULL financial protection from losses which might result from secondary-recovery operations in Kelly-Snyder field of West Texas has been offered nonsigners of the Scurry Area Canyon Reef Operators Committee unit-operation plan.

In the first such guarantee believed to have ever been made in the petroleum industry, 18 companies have signed documents agreeing to pay in cash to nonsigners of the agreement the difference between what their leases actually produce under water and gas-injection and what they would have produced without such operations, in the event a loss should be caused by injection.

The offer is contingent upon approval by the Texas Railroad Commission of field-rule amendments proposed by SACROC which would govern the secondary-recovery operations.

A hearing on these amendments has been recessed until May 27 to give opponents of the plan an opportunity to study evidence presented by SACROC before the commission April 27-28 *(The Oil and Gas Journal, May 4, page 68).*

A SACROC spokesman said the participating companies were "so certain" that "nobody will get hurt" as a result of injection operations that they were willing to offer the guarantee voluntarily.

SACROC engineers months ago had predicted the water-flood and gas-injection program would more than double oil recovery in the field, estimating an ultimate recovery by primary means of 501,048,000 bbl. or a total recovery under the injection plan of 1,221,048,000 bbl. At the Railroad Commission hearing a Houston consultant, Martin Miller, told the commission his independent estimates were 667,900,000 bbl. by primary means and 1,462,900,000 with secondary-recovery operations. His estimate of the amount of recoverable oil to be added by water-flooding, 795,000,000 bbl., was greater than that predicted by SACROC.

How it would work . . . The unique loss-guarantee plan provides that if a nonsigner' producing lease should go off production and the royalty or working interest should feel that its abandonment was premature and due to injection operations, the firm of DeGolyer & MacNaughton would be called in to determine how much oil and gas would have been recovered from the tract had there been no injection.

If this amount should be greater than that actually produced, the signers would make cash payments covering the difference.

The agreement provides that in calculating the difference, reasonable production costs would be considered, and that the cash payments would be made monthly and would be based on the current market value. The monthly payments would be based on the amount of oil and gas allocated under the unitization agreement to a similar tract within the unit.

"This agreement is made and entered into without in any way admitting any obligation to do so and without admitting that the rights of the nonsigning interest owners are not fully protected without the undertakings herein set forth," the documents say. They provide also that the offer shall not become effective "unless the field rules and injection plan proposed in behalf of the unit" are approved.

Signers of the documents are Pure Oil Co., Magnolia Petroleum Co., Tide Water Associated Oil Co., Pan American Production Co., Phil Yeckel, Joseph I. O'Neill, Jr., Cities Service Oil Co., Cities Production Co., Standard Oil Co. of Texas, Skelly Oil Co., Placid Oil Co., Lone Star Producing Co., Hunt Oil Co., J. S. Abercrombie, Sun Oil Co., Seaboard Oil Co. of Delaware, Sunray Oil Corp., and The Texas Co.

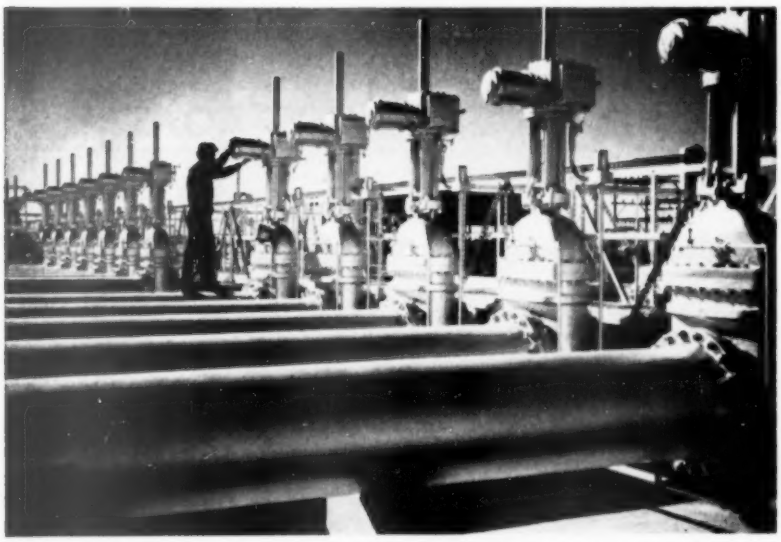
Rule proposals . . . Principal changes in the field rules proposed by SACROC were these:

. . . Setting of the permissible gas-oil ratio at 1,000:1, rather than 2,000:1,

but applying as a credit all gas injected into the producing formation.

. . . Granting of increased allowables to wells in the field on the basis of an additional 0.2 bbl. of oil for each barrel of water injected. This proposal was made on the assumption that water injection would increase the MER of the wells and the ultimate recovery of the field and therefore would merit a higher allowable.

. . . Transferring to other wells allowables for those converted to injection, those producing gas at a ratio higher than 1,000:1, wells producing more than 10 per cent water, or wells shut in for pressure regulation or other reasons.



MANIFOLD AND GIANT VALVES at West Texas Gulf's Colorado City station. From the control room the operator can direct the operation of this complex network by push buttons. Some of the valves weigh as much as 11,000 lb.

Official Opening Set

West Texas-Gulf to dedicate huge 26-in. crude carrier May 12 in ceremony at Colorado City, Tex., pump station

F. Lawrence Resen

COLORADO CITY, Tex.—The largest crude-oil pipe line in North America, West Texas Gulf Pipe Line Co.'s 26-in. carrier from West Texas to the Gulf Coast, will be dedicated here May 12 at the starting point of the line.

With an ultimate capacity of approximately 440,000 bbl. of crude oil per day, the line extends 466 miles from Colorado City to a terminus on the Gulf Coast near Nederland, Tex. In addition, a 20-in., 112-mile spur extends from Wortham, Freestone County, to Longview in East Texas.

The big line, which is presently providing an initial capacity of 301,000 bbl. daily for the movement of Permian basin crude, represents a joint undertaking of five companies, with West Texas Gulf being owned by Gulf Refining Co., Sun Oil Co., Cities Service Pipe Line Co., Sohio Pipe Line Co., and Pure Transportation Co.

Presiding at the ceremonies will be J. H. Russell, president of West Texas Gulf. Principal speakers will be Gen. E. O. Thompson, Texas Railroad Commission, and L. S. Wescoat, president of Pure Oil Co.

Route . . . The system begins at the Colorado City pumping station, Scurry County, where 10 feeder lines, including the 24-in. Mesa pipe line from the Midland area, bring oil into the tank farm there. The line runs eastward through Mitchell, Nolan, Taylor, and Callahan counties to the Ranger station in northeastern Eastland County, a distance of 131.5 miles. There it turns southeast, crossing Erath, Hood, Somervell, Johnson, Hill, and Navarro counties to the Wortham station in western Freestone County, a distance of 142 miles. At Wortham the system branches with a 20-in. line running to Longview and the 26-in. main line continuing to the Gulf Coast.

The main line continues in a southeasterly direction for 193 miles, crossing Leon, Houston, Trinity, Polk, Liberty, and Hardin counties and terminates at the Sun and Pure Oil tank farms at Nederland in Jefferson County, south of Beaumont.

The Longview segment branches from the Wortham station in a northeasterly direction across Anderson, Henderson, Van Zandt, Smith, and Upshur counties to Mid-Valley Pipeline Co.'s Longview station, Gregg County, a distance of 112 miles.

Capacities . . . Present operating capacity is 301,000 bbl. daily from Colorado City to Wortham. The Gulf Coast segment has a 225,000-bbl. capacity and the East Texas spur has a capacity of 140,000 bbl.

Three intermediate pumping stations now under construction will increase present capacity so that the Colorado City-Wortham section can handle 381,000 bbl. daily and the Wortham-Nederland section 275,000 bbl. daily. The intermediate pumping stations are being constructed between Colorado City and Ranger, Ranger and Wortham, and Wortham and Nederland. A fourth intermediate station is planned ultimately at Brownsboro, between Wortham and Longview.

Design of line has been such as to provide for approximate ultimate capacities as follows: Colorado City to Wortham, 440,000 bbl. per day; Wortham to Nederland, 320,000 bbl. per day; and Wortham to Longview, 200,000 bbl. per day.

Tankage . . . At the Colorado City station tankage has been installed to handle about 2,172,800 bbl. of crude. It consists of four 176,000-bbl. and twelve 122,400-bbl. pan-type floating-roof tanks. All four 176,000-bbl. tanks are used for sour crude. Of the other tanks, three are used for Ellenburger crude, four for semisweet crude, and five for Scurry crude.

At the Ranger station, 165,000 bbl. of storage capacity is provided by three 55,000-bbl. tanks. Two of these are for North Central Texas crude, and one is for use in the relief system.

At Wortham, 1,452,000 bbl. of storage is provided by twenty 55,000-bbl. tanks and two 176,000-bbl. tanks.

Contractors . . . Firms handling pipeline construction include: Anderson Brothers Corp., Houston; Associated Pipe Line Contractors, Inc., Houston; R. H. Fulton & Co., Lubbock, Tex.; Panama-Williams Co., Houston.

Films handling station construction include: H. B. Zachry Co., San Antonio; Graver Construction Co., Houston; Midwestern Constructors, Inc., Tulsa.

Gas Tax Upheld

Supreme Court refuses to review lower-court ruling

AUSTIN.—Texas' controversial gas-gathering test is set for additional fireworks as the state's Supreme Court refused to review a Circuit Court of Appeals ruling which upheld the levy passed by the 1951 Texas Legislature.

The court's action, in effect, upheld the Circuit Court's ruling and paves the way for pipe-line companies involved to take the case to the United States Supreme Court for a final ruling.

The situation at the present time finds all major companies but one—El Paso Natural Gas Co.—paying the tax under protest, which is tying up approximately 1 million dollars per month pending settlement of the case. The tax involves the levying of 0.45 cent per thousand cubic feet of natural gas entering the pipe lines.

The tax was held unconstitutional by the 126th District Court in July 1952, but this ruling was reversed when the state appealed to the Circuit Court of Appeals. Its ruling upholding the state was then appealed to the state Supreme Court, which has just refused to review the case.

Atty. Gen. John Ben Shepherd said the court's action has paved the way for the case to go quickly to the United States Supreme Court for final disposition if the companies cooperate. Otherwise, he said, a decision which can be made in 6 months could drag for years—and continue to tie up a considerable amount of potential revenue to the state.

However, Everett Looney, one of the attorneys representing the pipe-line companies in the case, indicated that the state Supreme Court would be asked to rehear the case. He did not indicate whether it would eventually be carried to the United States court, although this has been assumed.

Benedum Production Bought

MIDLAND, Tex.—Sinclair Oil & Gas Co. has acquired the interests of Slick-Urschel Oil Co. and Hewgley Drilling Co. in Benedum pool of Upton and Reagan counties, West Texas.

The property changing hands in the transaction consists of 4,274 net producing acres with a current production of about 2,100 bbl. of oil daily.

Sinclair Oil & Gas is the producing subsidiary of Sinclair Oil Corp.

EASTERN

Plant Considered

Pan Am studying sites for new East Coast refinery

NEW YORK.—Pan American Refining Corp. is presently studying three prospective sites for a proposed 25,000 bbl. per day East Coast refinery.

Although engineering plans are not yet fixed pending acquisition of a suitable site, the refinery is expected to comprise a conventional fuels plant, producing gasolines, kerosine, burning oils, and heavy fuel oil. It will include atmospheric and vacuum crude distillation, catalytic cracking, polymerization, and product treating facilities. It will be designed for the possible processing of sour crudes.

The three sites under study are located in Rhode Island, New Jersey, and Maryland. At Portsmouth, R. I., located on Narragansett Bay at the north end of Aquidneck Island, the company is understood to have optioned three tracts and is interested in a fourth. This possible site is located north of Newport, R. I., and south of Fall River, Mass.

Options are also held on 1,000 acres located on the Delaware River at Pedricktown, N. J., which lies opposite Claymont, Del., midway between Chester, Pa., and Wilmington, Del. The third site under consideration is situated in Talbot County, Maryland, on the east shore of Chesapeake Bay, about 25 miles southeast of Baltimore.

Deep-water facilities to permit ocean-going-tanker deliveries of crude and adequate supplies of fresh water are primary considerations in selecting the new plant site. At this early stage, Pan American reports that no crude supplies have yet been lined up for the new refinery but it will be designed to process some foreign crudes if necessary. From the transportation standpoint, the Portsmouth site offers the deepest water for tankers.

Third major for East . . . Pan American is the third major oil company in the past 2 years to announce an interest in building a new East Coast refinery. Esso Standard Oil Co. is also considering a new refinery in Virginia. An option is held on 800 acres in Norfolk County on the Elizabeth River, and the company recently acquired options on another tract of 950 acres on the James River in York County. Other sites in Virginia and North Carolina are understood to be under consideration. The proposed Esso refinery may have a capacity of 40,000 to 50,000 bbl. per day, and will produce fuels.

Shell Oil Co. is understood to have made long-range plans for an East Coast refinery which may be located in the Sewaren-Woodbridge area of New Jersey. These plans are currently being held in abeyance.

WEST COAST

Mining Right Said Taxable

LONG BEACH, Calif.—The City of Long Beach is preparing to assess Long Beach Oil Development Co. and Richfield Oil Corp. on their "mining rights" in Long Beach Harbor on the basis of an opinion issued recently by the city attorney's office that the oil companies' exclusive right to produce oil is taxable.

No estimates have been made as yet as to how much money the city would realize from the assessment, which would be made retroactive to the start of oil operations. However, the Long Beach assessor's office said the sum would be substantial.

Basis for the city attorney's opinion is a decision by the District Court of Appeals in a case involving Continental Consolidated versus the County of Los Angeles. Continental contended that the county was illegally assessing oil operators because it did not own the land. The court ruled for the county, and the ruling was upheld in effect by the Supreme Court, when it refused to review the decision.

The Long Beach assessor said basis for the assessment will be the number of barrels of oil in place.

Seismic Permit Issued

SAN DIEGO, Calif.—Richfield Oil Corp.'s application for permission to conduct seismic exploration for oil off the coast of southern California has been approved in part by the California Fish and Game Commission.

Richfield will be allowed to carry out seismic operations in the area between the seaward projection of the western limit of Santa Barbara and Point Conception and surrounding Santa Rosa and Santa Cruz islands.

The company was denied a permit to explore between the seaward projection of the eastern limit of Santa Barbara and Point Dume on grounds that this is an important fishing area.

Sound Selling vs. Smart Talk

Today, essentially, all of the chemical companies have established technical service and sales-supporting technical work. One corporation has 25 laboratories devoted to this type of work supported by 29 field laboratories. The total investment by the industry in such facilities, must run well into the tens of millions of dollars, which is one measure of how importantly the industry regards the sales function.

It is now estimated that 70% of the average chemical company's sales staff is technically trained compared with probably less than 25% only 20 years ago and an insignificant percentage 30 years ago. This current mode of selling is epitomized in the slogan of one chemical manufacturer, namely, "Serving Industry through Practical Applied Science."

From an article: "Selling . . . Its Importance in the Chemical Industry," by J. Warren Kinsman, Vice-President, E. I. du Pont de Nemours & Co., Wilmington, Del., in Chemical Engineering Progress.

Nalco appreciates the use of its slogan, "Serving Industry through Practical Applied Science", as an example of the modern approach to chemical sales. 100% of Nalco's field service representatives are technically trained to help industry make full practical use of the chemicals and methods developed by the Nalco Laboratories: Water, Microbiological, Physical Chemistry, Organic Chemistry, Corrosion, Micrography, Metallographic, Experimental Boiler, Combustion, Oil Treatment, Paper, Ion Exchange, Weed Control, Production Control.

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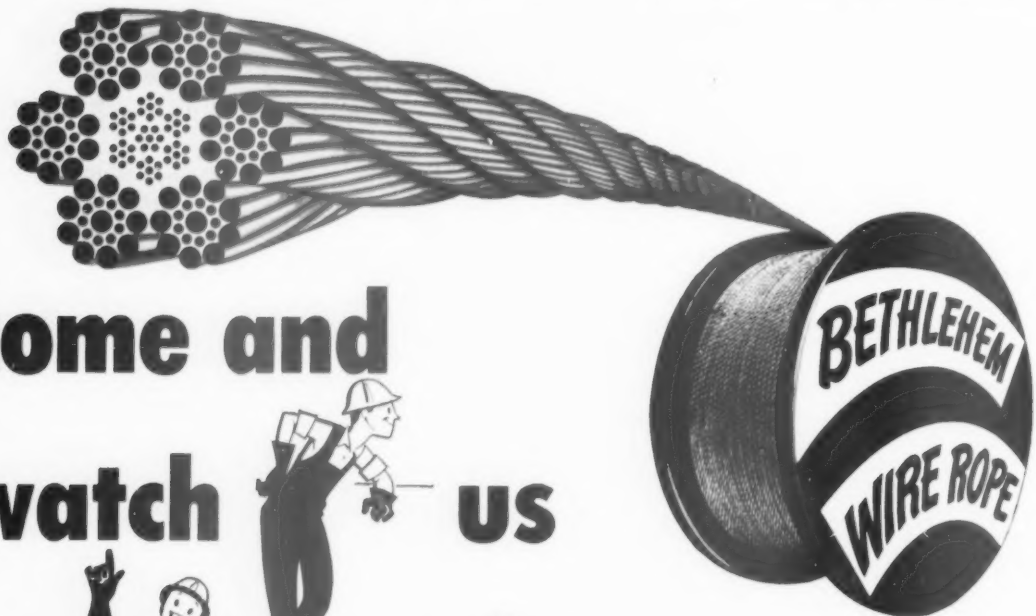

come and watch us make WIRE ROPE

When you are in Tulsa for the Oil Show, by all means pay us a visit at the Bethlehem exhibit.

There's going to be a wealth of interesting things to see. For instance, we'll show you wire rope being made right before your eyes. Ever seen that before?

You've probably used Bethlehem wire rope many times. But do you know how those strands are actually laid together into a good rotary line? We'll demonstrate the principle on a real production machine that enables you to follow every detail.

Naturally, in the big, colorful Bethlehem exhibit, you'll see many things besides the making of rope. But we of the Wire Rope Division would like to show you around at least part of the time. So don't forget to look us up; we'll welcome the chance to know you better!

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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When you think WIRE ROPE
... think BETHLEHEM

Production Men Meet

New developments in drilling, completion techniques and other subjects are discussed at A.P.I. meeting in Casper

CASPER, Wyo.—A discussion of the import question, with particular reference to heavy fuel oils, was one of the highlights of the spring meeting of the Rocky Mountain district, American Petroleum Institute Division of Production, held here May 7-8. The talk on imports was given by M. J. Rathbone, a director of Standard Oil Co. (N. J.), New York.

Four A.P.I. citations for service were presented by John G. Pew, vice president of Sun Oil Co., and A.P.I. vice president for the Division of Production. The awards went to C. L. Larson, Jr., Stanolind Oil & Gas Co., Casper; H. H. Healy, Ohio Oil Co., Casper; Claude Peavy, Phillips Petroleum Co., Denver; and W. M. Saxon, Pure Oil Co., Billings, Mont. Papers and their authors are as follows:

Platte Pipe Line Co. . . . This new crude carrier, now in operation for several months, can transport oil from the Rocky Mountain region to the Great Lakes and St. Louis areas at tariff rates which compare favorably with those originating on the shorter pipe lines out of the Southwest region. This is due to the large diameter of the Platte pipe line, its all-electrical pumping stations, its microwave communications and supervisory controls, and the 5,000-ft. drop in elevation.

On Platte Pipe Line Co., a report was given to the Casper A.P.I. by Millard K. Neptune, Platte's president. Neptune said the new line has already generated a substantial increase in the exploration and development activities in the Rocky Mountain region, and it is making possible the marketing of large quantities of crude oil which otherwise could not be marketed.

Platte Pipe Line has contributed toward establishment of a firm foothold for Rocky Mountain crude oil in the Great Lakes and St. Louis consuming regions, Neptune said. In the months and years ahead, when Canadian and Williston oil will be aspiring for the Great Lakes crude-oil market, Neptune predicted the Platte Pipe Line will become an increasingly important instrument in maintaining and expanding outside markets for the crude oil produced in the Rocky Mountains.

Hydraulic fracturing . . . Roscoe C. Clark, Jr., Continental Oil Co., Ponca City, Okla., gave a paper on application of this new technique to the stimulation of oil and gas production.

Clark said Conoco's study of a large number of fracturing treatments has revealed practical methods for selecting wells which should respond favorably to hydraulic fracturing.

In general, the best results can be obtained under the following conditions: (1) when there is local permeability blocking in the vicinity of the well bore; (2) when sandstone or conglomerate formations are treated; (3) when viscous oils are used as a fracturing fluid; and (4) when fracturing proceeds through perforations.

Hard-rock drilling . . . This subject was outlined by L. L. Payne, Hughes Tool Co., Houston, who discussed the characteristics of hard rocks and laboratory observations of changes in the physical properties of hard rocks under atmospheric conditions, as compared to their physical properties when subjected to fairly high pressures which simulate their condition at the bottom of the well.

Payne also discussed the response of certain hard rocks to the crushing action of a relatively new type of hard-formation rock bit which employs the use of sintered tungsten carbides as cutting chemicals, including data and economics covering field performance of this type of bit in West Texas, Oklahoma, and the Rocky Mountain region.

Core-hole drilling . . . H. D. Hoopman, Ohio Oil Co., North Platte, Neb., described an experiment in slim-hole drilling and coring which has been conducted by Ohio Oil during the past 10 months in Nebraska.

Purpose of core-hole exploration is to obtain stratographic information and evaluate the possibility of petroleum production at a reduced cost—as compared to standard wildcat drilling. Hoopman gave theory and design considerations, and described the highly portable rig and auxiliary equipment used by Ohio.

Vapor-phase cooling . . . W. L. Giezentanner, Continental Oil Co., Casper, reported on utility of vapor-phase cooling systems which are equipped with radiators or condensers to condense the steam and return the water to the system. The engine temperature is determined by the boiling temperature of water. Engine efficiency is improved while lowering upkeep.

Several installations have been made by Conoco in the company's generating plants, Giezentanner said, and benefits realized from the vapor-phase cooling technique after problems related to piping were overcome; reduced oil consumption and reduced cylinder wear are evident.

Supervisory development . . . This subject was outlined to the Casper audience by W. J. Wilson, with Ohio Oil Co. at Findlay, Ohio. Wilson detailed the broad nature of supervisory development, the historical background, and the evolving industrial expansion which prompts current interest in the development of supervisors. He also suggested ways and means to be considered for the development of supervisors.

Formation testing . . . An especially informative report was given on formation testing as applied to Rocky Mountain conditions. The author, J. L. Fusselman, assistant manager, Trigood Oil Co., Casper, said that Rocky Mountain formation conditions will seldom prevent a successful drill-stem test, since most pays are consolidated enough to permit open-hole testing.

Fusselman first detailed the planning and preparation for drill-stem testing, going into matters of packer and anchor selection, test tools, pressure and temperature recorders, jars and safety joints, reversing equipment, etc. Next he detailed actual testing procedures. Fusselman then explained the practices in different Rocky Mountain fields including the following areas: Williston basin, Uintah basin, Denver-Julesburg basin, Big Horn basin, and Powder River basin.

Industry Briefs

WASHINGTON.—The Armed Services Petroleum Purchasing Agency will open bids May 19 for the supply of approximately 450,000 bbl. of aviation lubricating oils, for delivery as required at various points in the United States and Alaska during the fiscal year beginning July 1.

WICHITA. — The Kansas Corporation Commission has set the state's crude-oil-production allowable for May at 310,000 bbl. daily—unchanged from April.

Tidelands Bill Passes

Senate approves measure 56 to 35; conference committee expected to produce acceptable compromise bill quickly

Bertram F. Linz

WASHINGTON.—Decisively rejecting all amendments proposed to sabotage or weaken legislation restoring to the coastal states the submerged lands within their seaward boundaries, the Senate passed the Holland bill May 5 by a vote of 56 to 35.

Final action on the bill came almost exactly a month after the measure was brought up in the Senate for debate. Because it differs from the bill previously passed by the House, principally in the lack of provisions for administration of the Continental Shelf beyond the state boundaries, the legislation was returned to the House, where leaders said the Senate version would be accepted this week and the measure sent to President Eisenhower for signature. Should the House fail to do this, the bill would go to a conference committee for compromise.

To get the legislation out of the way, the Senate had first to vote on a number of amendments most of which were designed to nullify the effort to restore title to the submerged lands. Several hours were required to dispose of the amendments before the vote could be taken on the bill itself.

Fight not over . . . Passage of the tidelands measure by the Senate disposed of one of the chief stubbling blocks to the leadership's plan to adjourn Congress by the end of July. But opponents of state ownership predicted congressional action did not end the controversy, and at least two states are expected to go into the courts in an effort to have the measure set aside and to get "their share" of the value of the underwater resources. Such suits have been threatened by the governors of Rhode Island and West Virginia.

The theory that all states should share in the underwater values was raised in an apparent effort to whip up public sentiment against the legislation.

Its proponents placed a value of $350,000,000,000 on the oil, gas, fish and other resources, divided the figure by two with the idea of applying half of the value to the reduction of the national debt or aid to education, and then figured out that the per capita share of the people in the $175,000,000,000 "kitty" was $1,161.26.

Remaining differences . . . The House bill carried provisions for administration by the federal Government of the Continental Shelf area beyond state boundaries, on which leases would be issued for exploitation of oil and gas deposits. The Senate is not expected to accept those provisions, which are not satisfactory to the three states directly involved, but plans to bring up a bill within the next few days which will permit the states to apply production taxes in return for policing the area and administering conservation practices.

Except for possible controversy over the way in which the states are to share in the revenues or production from the federally-held area it is not expected there will be any opposition to the bill, which will be the final step toward resumption of exploration and development in the submerged lands which has been halted since the Supreme Court decisions holding that the federal Government enjoyed paramount rights beyond the low-water mark.

Import Quotas Opposed

Administration officials, headed by Interior Secretary McKay, urge 1-year continuation of reciprocal-trade act

WASHINGTON.—A half-dozen top administration officials urged the House ways and means committee last week to reject proposals for imposition of a quota on oil imports.

They asked that the Reciprocal Trade Agreements Act be continued unchanged for 1 year. Tacitly promising that relief will be granted through the Tariff Commission to industries seriously injured by imports.

Spokesmen for the domestic oil and coal industries are scheduled to appear before the committee this week to challenge the administration's position. They will point out that efforts to secure relief under the Escape Clause provisions have been futile in the past and will take the position the situation is too serious to permit delay while a commission studies the whole question of international trade policy, as promised by President Eisenhower.

Most of the department heads testifying before the committee touched on the proposals for import quotas, with Interior Secretary Douglas McKay, developing the administration's viewpoint in greatest detail.

Expressing his recognition that the domestic industry must be given "every feasible opportunity" to maintain its strength and expand, McKay nevertheless insisted that limitations on imports did not provide an ideal solution for the present weakness of the industry.

However, McKay said, "domestic production has been reduced in recent months and there should be a corresponding cut in imports." But, he added, there is evidence the industry is effecting such adjustments itself.

Quota might backfire . . . McKay took the position that a 10 per cent quota on over-all oil imports and a 5 per cent quota on residual fuel oil would not reduce the imports of crude but would permit an actual increase over 1952 levels.

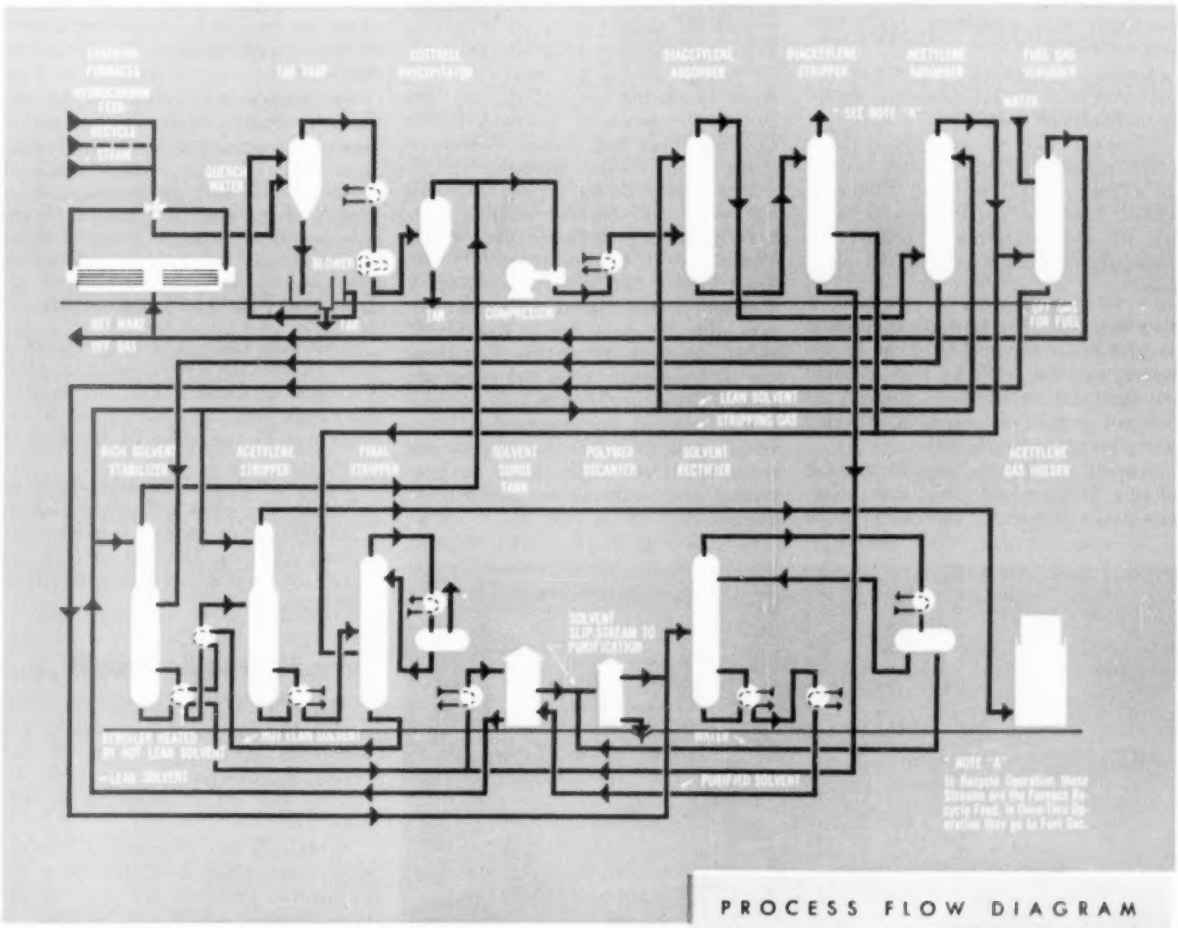
He added that the limitations on residual would not materially aid the coal industry and asserted that to bar nearly 80 per cent of our imports of fuel oil could have serious effects upon our economy.

Impact on East Coast . . . "Practically the entire impact of such restrictions will fall on the East Coast which consumes practically 100 per cent of the imported fuel oil," McKay told the committee. "To what level the price would go with shipments limited to 20 per cent of existing levels, no one knows. It is not difficult to imagine a situation in which these limitations would impose restrictions in the use of energy upon consumer industries that would far outweigh any benefits derived by the coal industry."

The major problems, he said, are, first, to make sure we continue to have adequate quantities of low-cost energy available in proper form, at the place and time needed, at the same time taking a long-range view of the problem from the standpoint of security and peacetime requirements and not hamper domestic development and become un-

NOW—ACETYLENE FROM HYDROCARBON FEED via the Wulff Process

With heavy demands for the hundreds of petrochemical end products that may be synthesized from acetylene, the need for low-cost acetylene as a raw material is becoming urgent. The Wulff Process now answers this need with a high purity acetylene at the lowest cost ever offered by any process. Any petroleum hydrocarbon conveniently vaporizable can be used as a feed stock. Recent operations of the Wulff Process have proved it to be technically sound and commercially attractive. If your plant is convenient to a source of natural gas, ethane, propane, etc., it will pay you to investigate the possibilities of manufacturing acetylene economically by the Wulff Process.



PROCESS FLOW DIAGRAM

This design flow scheme represents a typical Wulff Process plant for producing low-cost acetylene at 99+ volume percent purity from natural gas or propane. Two basic steps are involved: cracking of hydrocarbons to produce acetylene in a mixture of gases, and recovery and purification of the dilute product contained in the cracked mixture. Feed hydrocarbon is cracked in regenerative type furnaces heated by air-combustion of off-gas from the recovery section. No oxygen plant is required. The recovery and purification section is of conventional design operating at moderate temperatures and pressures. Only a single inexpensive readily-available solvent need be used. Operation is continuous and virtually automatic, requiring a minimum of operating personnel. Power demands are moderate, maintenance costs are low, hazards are negligible and there is practically no waste disposal problem.

The Wulff Process is available through Fluor, a name famous in process design, engineering and construction for the petroleum and chemical industries. For information on recent developments in this field, write for Bulletin EC-PA-0.002.

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duly dependent upon foreign sources; and second, to minimize the temporary imbalances which occur from time to time in our fuel and power supplies.

Long-term outlook . . . "In the long run it may be desirable to place more effective controls over imports of petroleum products in order to guarantee the continued growth of our own petroleum industry and to rehabilitate our coal industry," McKay admitted. "I can't say now that such controls are required. But if the proposed study should find them necessary, such controls should be applied in a way that orderly adjustments could be made by producers and consumers, both here and abroad."

Under questioning by committee members McKay said oil quotas should be a last-resort measure.

"I don't like to see Government place regulations on industry except as a last resort," he said. "Industry should have the opportunity to work out its own problems. I believe the importers now are aware of the situation."

Reaction . . . The immediate reaction to McKay's testimony by domestic interests was that while he had admitted the need for reduction of imports he had not pointed out any way in which it could be accomplished.

Russell B. Brown, general counsel of the Independent Petroleum Association of America, expressed doubt that the companies would be willing to take action at a time when their importing policies are under attack in the courts unless definitely assured in advance of the support of the Department of Justice.

Brown definitely ruled out any proposals for relief of the domestic producers and refiners other than import limitations. He pointed out that Tariff Commission action limited to an increase in the import tax alone, as suggested by cabinet officials, would be of no benefit since, he said, importing companies have declared that the rate of tax is of little importance.

CANADA

Westcoast Gas Spur Approve

OTTAWA, Ont.—Canada's Board of Transport Commissioners last week approved the second phase of Westcoast Transmission Co.'s $113,000,000 project to pipe natural gas from the Peace River producing area of Alberta and British Columbia to southern British Columbia and the Pacific Northwest states of the United States.

The portion of the project approved last week calls for construction of a branch line off the main Peace River-Vancouver, B. C., line to carry gas to Trail, B. C., and eastern Washington. The spur would extend from a connection with the main line at Brookmere, B. C., through Princeton and across the international boundary into the United States at Osoyoos.

The commission approved a Westcoast application last year to lay the main line from Peace River to Vancouver and south as far as Portland, Ore.

Hearings are scheduled to resume May 25 on the Westcoast project before the U. S. Federal Power Commission. FPC approval of the line is vital, since the project is considered uneconomical without the United States market.

Westcoast's chief competitor for the lucrative Pacific Northwest market is generally conceded to be Pacific Northwest Pipe Line Co., which plans to serve the area with gas produced principally in the San Juan basin of New Mexico.

Styrene Plant in Operation

SARNIA, Ont.—The first units of a new $4,000,000 styrene plant of Dow Chemical of Canada, Ltd., are now in operation, and the entire plant is expected to be operating by the end of May.

Construction is 2 months ahead of schedule. The plant will produce about 2,000,000 lb. of styrene monomer per month, enabling Dow to increase its output of several types of polystyrene plastic materials.

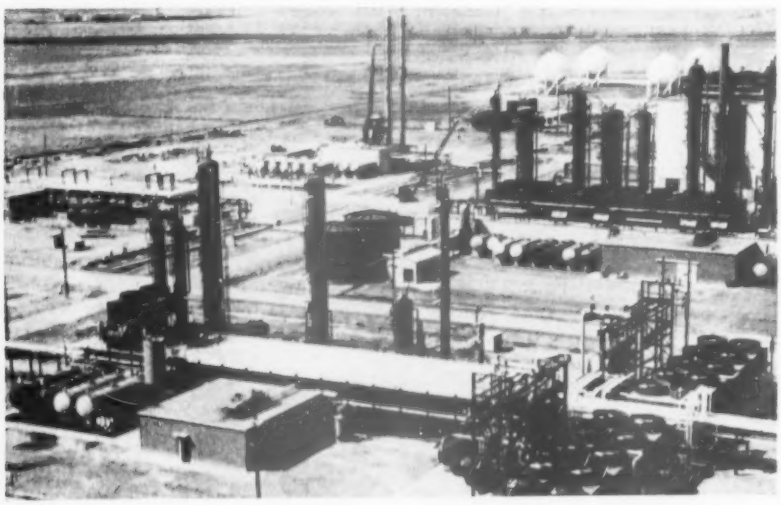
Lube Plant to Be Rebuilt

MONTREAL.—Canadian Oil Companies, Ltd., revealed last week that it will build immediately a new oil and grease manufacturing plant here, replacing the plant destroyed by fire April 28.

W. Harold Rea, president of the company, said officials of Canadian Oil Companies currently are studying the type of plant which will be built, its size, and layout.

The destroyed plant went on stream only 18 months ago.

Pending reconstruction, reserve equipment and other facilities at other plants will be used to maintain the company's lubricant production, Rea said. Blending and canning departments at the firm's big Toronto plant, where some lubes were made before the Montreal plant opened, were put back in service rapidly. Blending oils in tanks not consumed in the fire at Montreal were rushed to Toronto by rail.



New Petrochem Plant Opens

Grand opening of the Pampa, Tex., petrochemical plant of Celanese Corp. of America was held on May 8. This aerial view, looking northwest, shows the plant's reaction units in the foreground; the purification units in the right background; and the special products unit in the center background. Methanol, acetone, acetic anhydride, acetic acid and higher acids, and vinyl acetate and other esters are among the plant products. Natural gas and L.P.G. are converted into these products by a process of limited, carefully controlled oxidation. Other Celanese plants are located at Cumberland, Md.; Newark, N. J.; and Bishop, Tex. Plants of Celanese affiliates are located in Canada, Mexico, and Latin America. Opening of the Pampa plant was attended by Gerald L. Farrar, Journal engineering editor.

Imports-Cut Alarm

Quota now proposed causes concern in Venezuela; it would cut production, limit buying, encourage new arrangements

Dahl M. Duff

CURRENT estimates of the production loss Venezuela would suffer under the proposed 5 per cent limitation on United States residual fuel-oil imports range up to as high as 460,000 bbl. daily.

This figure is based largely on the present approximately 60 per cent yield of heavy fuel oil in the refining centers operated by the Shell and Standard Oil Co. (N. J.) organizations at Curacao and Aruba.

The limitation on fuel-oil imports to 5 per cent of the preceding quarterly domestic demand, as proposed in more than a score of bills introduced in Congress, would force shipments back from about 351,000 bbl. daily to about 77,000 bbl. daily. The reduction, on the basis of these 1952 figures, would amount to about 274,000 bbl. daily.

The Aruba and Curacao refineries operate almost entirely on Venezuelan oil, and in terms of crude runs, the 274,000 bbl. daily works out to nearly 460,000 bbl. daily. This estimate disregards the possibility of (1) the development of other markets for at least part of this fuel oil, and (2) adjustments in refinery yields to compensate for the loss of the East Coast market.

Other markets limited . . . It does not seem likely that overseas outlets could be found for any substantial part of the fuel oil which would be forced out of the United States. The Caribbean refineries are geared to residual demand on the East Coast, and Europe's needs are now met by its own refining industry. Surplus capacity has in fact developed in several countries of Western Europe. France, for example, is planning a special tax on fuel oil to protect its own domestic coal industry which is burdened by excess stocks.

A 400,000-bbl. daily production cutback in Venezuela would come to more than 22 per cent of the 1952 production which averaged slightly above 1,800,000 bbl. daily. This would occur in a country which obtains more than 90 per cent of its foreign exchange and approximately half of its governmental revenue from operations of the oil industry.

Venezuelans alarmed . . . These and other facts on the potential effect of the pending import quota proposals explain the alarm with which the bills are viewed in Caracas, both by governmental officials and executives of the operating oil companies. The threat of import restrictions has aroused new hostility to the United States, and there is talk of reorienting Venezuela's economy toward Europe with barter deals and other arrangements to dispose of the oil production.

A production cut of the magnitude anticipated would seriously depress the oil industry in Venezuela, and the economic effects would in turn have repercussions in the political field, since in Venezuela as elsewhere there are nationalistic and left-wing elements anxious to take advantage of any opportunity.

Passage of the limitation on fuel-oil imports would almost certainly kill any chance that the Venezuelan Government will grant new oil concessions. No new acreage has been given in the country for nearly 10 years, although it has been considered from time to time. A year and a half ago, the government took offers aggregating nearly $150,000,000, but did not proceed further. These bids presumably are still awaiting action.

Other aspects . . . One legal question involved in the bills now pending is whether they violate the Venezuelan-United States agreement negotiated last year which cut the excise tax on imports under 25° gravity to 5¼ cents a barrel. This 1952 agreement contained the standard escape clause common to such treaties. Though Congress has unquestioned authority, invoking the escape clause normally is predicated on a full administrative determination that such a step is necessary because of damage to domestic industry.

The concern over the proposed import legislation is spreading from Venezuela to important commercial and manufacturing interests in the United States, who are vitally affected since Venezuela takes approximately half a billion dollars annually of goods from this country. Increasing opposition to the bills is being registered from this source as well as from federal agencies such as the State Department which are traditionally interested in promoting international trade.

The Argentine ambassador in Caracas recently announced that his country is ready to buy more Venezuelan oil if the United States restrictions go through. He said he has instructions from his government to begin conversations with Venezuela to increase the ties between the two countries. Dollar-short Argentina for several years has been buying most of its oil from sterling British sources under a bilateral trade agreement.

Advisor Selected

Turkey reportedly engages Ball for help on oil law

MAX BALL, Washington, D. C., consultant, is understood to have been selected by the Turkish Government as its advisor in connection with the new petroleum policy opening up the country to foreign oil capital.

Reports in the industry for some time have been that the Turkish Government was seeking the services of an independent American oil man to assist in the preparation of the country's new petroleum legislation.

Ball's most recent work in the foreign oil field was a geological study in Israel. He later advised in the preparation of the oil law which was passed last year. This gives full scope to exploration by private capital and non-Israeli organizations. Ball is a former director of the Oil and Gas Division of the Department of Interior.

The Turkish Government last year decided to abandon the policy which for the last 19 years has restricted oil exploration to the government's Mineral Research Institute. The move was widely considered as an outstanding instance of oil "de-nationalization."

This development was formalized in a Ministerial declaration. It now needs to be implemented by full-fledged petroleum legislation. Reports are that the government is hopeful of obtaining action on the law at the present session of Parliament which ends in August.

Several firms active . . . So far, three major international companies have sent geologists to Turkey to survey its prospects. These companies are Shell, Standard Oil Co. (N. J.), and Socony-Vacuum Oil Co., Inc. Caltex, which is represented in exploratory work by the associated American Overseas Petroleum, Ltd., is known to be interested, and other companies are watching the legal situation.

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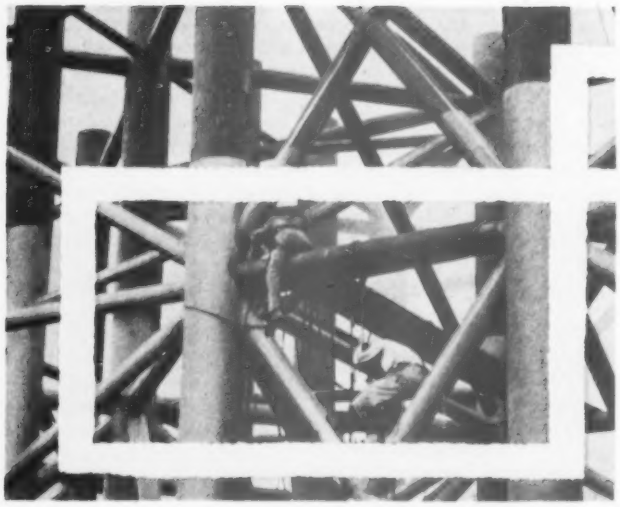
Here is an off-shore drill structure located in the main pass of the Mississippi River. This installation was painted in June 1948 with three coats of oil-base marine paint. Note the condition, *only one year later!* The coating just couldn't take it!



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Coatings based on VINYLITE Brand Resins applied to well structures, as shown in photograph at the left.

The Results?
In June 1949, VINYLITE Resin coatings were applied to a 10-well structure located under similar severe requirements of service. *Over two and one-half years later,* the corrosion engineer reported that all coatings applied on properly treated surfaces were in good condition.

VINYLITE Resin coatings always give longer, more trouble-free service . . . for oil refineries, pipe lines, marine equipment, plants, structures . . . wherever surfaces are exposed to rough treatment, corrosive chemicals, salt water, oils, industrial gases.

Properly applied, finishes based on VINYLITE Resins won't crack, chip, peel or fade. They really stay put on metal, concrete, and masonry.

Write Dept. PW-68 for a booklet giving facts about BAKELITE and VINYLITE Resin Coatings for the Petroleum Industry.

Photos courtesy of Minnesota Mining & Manufacturing Company, Detroit 2, Mich., whose COROGARD coating system, based on VINYLITE Resins, was used to coat this 10-well installation, and to repaint the structure where oil-base marine paint failed.

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working under reconnaissance permits which are nonexclusive and merely allow a preliminary study of the geology. Most interest has been shown in the southwestern part of the country, particularly around Alexandretta and Adana.

Socony-Vacuum has three geologists who at present are investigating prospects in Seyhan Province. Shell is studying this same Adana region, and Jersey's geological party also is interested in the Alexandretta Gulf basin. The reconnaissance permits, however, allow geological studies throughout the entire country with special authorization needed to enter certain reserved security areas.

Oil Deal Sought

Iranians act to encourage expanded trade with Japan

IRANIAN Government officials sought last week to encourage further oil trade with Japan, but there appeared to be considerable official and private sentiment among prominent Japanese that the country should stay clear of the controversial shipments.

Abbas Parkhideh, sales manager for the National Iranian Oil Co., was in Tokyo seeking to negotiate additional oil deals. He said he was confident that the Japanese Government would never restrict purchases of Iranian oil by private Japanese firms.

The single purchase by the Idemitsu Kosan company was a source of concern to many Japanese. The Nippon Times pointed out that Japan was under special need to expand its important trade with Britain, and that the possibility of retaliatory British action was something Japanese could not afford to "laugh off."

Anxiety expressed . . . Foreign office sources in Tokyo said the Japanese Government was anxious for an amicable settlement with Britain over the Idemitsu purchase. The Japanese Government replied to a British request for information on the shipment and was reported to have told London it was considering what steps could be taken to prevent similar deals by private Japanese firms in the future.

An official of the Idemitsu company said that the company had no definite plans for sending more tankers to Japan and denied reports that other vessels were on the way to Abadan. He said the Nissyo Maru, which left Abadan April 13, were expected to arrive at a Japanese port about May 30. Anglo-Iranian Oil Co., Ltd., is preparing to take legal action claiming ownership of the nationalized oil.

Meanwhile, another Italian tanker loaded at Bandar Mashur. The ship was the Alba which was making its second voyage on behalf of the Italian company, Supor. The Alba was reported to have lifted 12,000 tons, or about 90,000 bbl. The three Iranian cargoes already taken to Italy are involved in Anglo-Iranian lawsuits pending in Rome.

Seria Installations Damaged

Two geysers of mud and gas erupted recently in a section of Seria field in Brunei, North Borneo, causing considerable damage to a concrete plant, several buildings, and field equipment.

It was considered possible that drilling elsewhere in the field had penetrated a high-pressure gas pocket and allowed the gas to escape through fissures on up to the surface.

One of the two geysers emerged at the foot of a 70-ft.-high plant worth about $65,000 and used for the mass production of concrete. The hole rapidly expanded until it undermined the structure and caused its collapse.

R. E. Hales, managing director of British Malayan Petroleum Co., Ltd. (Shell), reported that this geyser covered a considerable area with a layer of hot mud and that several store buildings around the concrete plant were pounded to pieces. As a precautionary measure, about 300 persons were evacuated from a nearby housing area to temporary accommodations. The second smaller geyser caused the collapse of a small servicing rig derrick.

Both geysers first erupted April 25. The danger area was blocked off and safety patrols established. Brunei is the largest producing field in the Far East. Its output of about 104,000 bbl. daily comes from Tertiary sands at depths ranging from 1,600 to 6,900 ft.

Trinidad Strike Reported

United British Oilfields of Trinidad, Ltd., has found new oil production at Balata and Catshill in the Ortoire district of southeast Trinidad.

Depths and other data on the discovery were not disclosed, but the company said in London that the amount of oil developed thus far was too small to justify the construction of a pipe line. Tank trucks are being used to move the crude to the company's installations at Penal.

The discovery, however, has encouraged further work in the area, and drilling is continuing with an outlay of about $2,500,000 scheduled this year. U.B.O.T. has already spent about $8,000,000 on exploration in this section.

Line Completion Set

Construction of the new 24-in. pipe line which will move crude oil from Zubair field in southern Iraq to the Shatt-el-Arab tanker terminal at Fao is expected to be completed next October.

Eight miles of the line already are laid and another 12 miles of pipe strung. The new line parallels the existing 74-mile 12 and 16-in. system and will provide capacity to move another 100,000 bbl. daily of Zubair crude. The present system is operating at its limit of slightly more than 60,000 bbl. daily.

The operating company, Basrah Petroleum Co., Ltd., an associate of Iraq Petroleum Co., Ltd., announced recently that the 3,000,000th ton of crude was loaded at Fao, April 20, just 16 months after the terminal was opened. The vessel, the Panamanian-registered Standard, was the 250th tanker to call at the Fao terminal. The 3,000,000 tons shipped thus far from Fao represents virtually all Zubair's production and is equivalent to about 22,500,000 bbl.

International Briefs

Well RPN-32 of Pantepec Oil Co., C.A., in the Guario Dome area of its Roble Parcel 30 in eastern Venezuela has opened sands heretofore unproductive in this area. The well flowed 738 bbl. daily through ¼-in. opening. Gravity of the crude was 41.6°. The completion was in three sands of the Colorado section, the lowest at a total depth of 8,451 ft.

D'Arcy Exploration Co., Ltd. (Anglo-Iranian) has abandoned its test at Arreton on the Isle of Wight in southern England. The hole was taken to 5,161 ft., but no commercial production was found. Drilling began last October after considerable geological and geophysical work.

A second distillation unit has recent-ly been placed in operation at the Gothenburg, Sweden, refinery of Koppartranz Oljeaktiebolag. The additional equipment is expected to give the plant a production capacity during 1953 of 1,200,000 cu. m., or about 20,500 bbl. daily, and in 1954, of 1,400,000 cu. m., or about 24,000 bbl. daily. The refinery, which operates on purchased Middle East crude, is owned jointly by Stora Kopparbergs Bergslags, A. B., one of Sweden's leading timber and steel firms, and the Transatlantic Shipping Co., of Gothenberg.

PERSONALS

Imperial President

John R. White named head of Toronto organization

JOHN R. WHITE, 45, recently was elected president of Imperial Oil, Ltd., Toronto, Ont. He had served as executive vice president of the company since 1950.

White is a native of London, Ont., the city which in 1881 was also the company's birthplace. His father represented London in the House of Commons from 1921 to 1935.

He received a bachelor of applied science degree in mechanical engineering from the University of Toronto in 1931. Two years later he joined Imperial as a junior draftsman at the Sarnia refinery.

From 1936 to 1942 he gained experience in refining, production and oil transportation operations in the United States and Venezuela. He was appointed a vice president of Standard Oil Co. of Venezuela in 1942 and 2 years later returned to Canada as economic-coordinator for Imperial. He was appointed a director and vice president in 1945.

G. L. STEWART

George L. Stewart, president of Imperial Oil, Ltd., since 1949, has been elected chairman of the board. Named new vice presidents at the annual general meeting in Toronto were **J. K. Jamieson** and **Trevor F. Moore.** Jamieson was elected a director last year and Moore has been a director since 1950.

William M. Schulz, geologist for Kansas for Cities Service Oil Co., has been promoted to division geologist for the company's Mid-Continent division. He will continue to make his headquarters in Bartlesville, Okla. **Z. E. Stucky,** regional geologist for the Northwest division, has been appointed assistant to the company's chief geologist at Bartlesville. **F. M. Hoover** has been named research geologist for the Mid-Continent division and will continue his headquarters in Oklahoma City. **Paul Hyatt** has been transferred from Bartlesville to Oklahoma City as Oklahoma district geologist.

George W. Davis, Jr., has been appointed manager of the engineering department of Chemical and Geological Laboratories at Casper, Wyo. He formerly was in the engineering department of Stanolind Oil & Gas Co. in Texas and Wyoming. **William J. Crouch,** formerly with Amerada Petroleum Corp. at Casper, also has joined the engineering division at Casper.

P. H. DuVal has been named a vice president of Arkansas Pipeline Corp., Shreveport, a subsidiary of the newly formed Arkansas Fuel Oil Corp. DuVal formerly was superintendent of the oil pipe-line department of Arkansas Natural Gas Corp., which recently was merged with Arkansas Fuel Oil Co. to form Arkansas Fuel Oil Corp. *(The Oil and Gas Journal, April 27, page 126).*

Herbert H. Everetts, engineer in the mechanical department of the No. 1 refinery in Cleveland of Standard Oil Co. (Ohio), has been promoted to general foreman. Other engineers in the department who have been promoted are: **Royden K. Schlafly,** chief maintenance engineer, and **George R. Whitmyre,** general foreman.

A. J. Morris, manager of supply and transportation for Crown Central Petroleum Corp. in Houston, has been placed in charge of the company's pipeline activities as well as its crude-oil trading, purchase and transportation. He also will be in charge of similar activities for Crown subsidiaries and affiliated pipe-line companies.

A. W. Tarkington, Oklahoma City, vice president and central-region general manager for Continental Oil Co., has been appointed southwestern-region general manager at Fort Worth. He

TARKINGTON

K. W. BRILL

succeeds **H. H. Hinson,** Houston, recently elected vice president in charge of exploration. **K. W. Brill,** Houston, assistant general manager of Conoco's southern region, has been promoted to central-region general manager at Oklahoma City.

John M. Dillon, Jr., has been promoted from area gas engineer to district plant superintendent at the Elk City, Okla., gas processing and cycling plant operated by Shell Oil Co. He replaces **F. H. Rathjen,** who will undertake a special assignment.

LeRoy L. Stover has been promoted to assistant production superintendent for Oklahoma for W. C. McBride, Inc., Tulsa, at Seminole, Okla. Stover formerly was district foreman at Oilton, Okla. **David Paoli,** Kansas district foreman at McPherson, has been promoted to assistant production superintendent for Kansas, and will continue to make his headquarters at McPherson.

C. T. Klein has been elected a director of Cities Service Oil Co., Bartlesville, Okla. He is manager of the natural-gas division of Cities Service and is a vice president and director of American Gas Production Co.

Charles W. Lane, geologist, has been appointed chief geologist for Falcon Seaboard Drilling Co., Tulsa. Before joining Falcon Seaboard, he was a geologist for Deep Rock Oil Corp., and prior to that was with Delmar Oil Co. and Pure Oil Co. He will have charge of all geological activity in the Mid-Continent area for Falcon Seaboard.

PERSONALS

Trans Mountain Officials Meet

These Trans Mountain Oil Pipe Line Co. officials participated recently in the board of directors' conclave in Toronto following the annual shareholders' meeting. They are (seated, left to right): H. H. Anderson, vice president and general manager; W. J. Wilkins, executive department of Gulf Oil Corp., director and member of construction committee of Trans Mountain; W. M. V. Ash, president of Shell Oil Co. of Canada, Ltd., director and member of construction committee; S. D. Bechtel, president of Bechtel Corp., chairman of board; R. L. Bridges, president of Trans Mountain; Ian G. Wahn, secretary and director; (standing, left to right): J. K. Jamieson, director of Imperial Oil, Ltd., director and member of construction committee; J. S. Grepe, assistant manager of pipe lines for Standard Oil Co. of California, member of construction committee; Ivy Lee, Jr., Bechtel Corp., special assistant to S. D. Bechtel; D. L. Roberts, Canadian Bechtel, Ltd., project manager; S. M. Blair, vice president of Canadian Bechtel, Ltd., vice president and chairman of construction committee; D. E. Day, vice president of Richfield Oil Corp., member of construction committee; J. Grant Spratt, vice president of Anglo-Canadian Oil Co., Ltd., director; J. W. Hamilton, director of Imperial Oil, Ltd., director; Roy Martin, Canadian Bechtel, Ltd.; R. F. B. Taylor, treasurer. Ralph D. Baker, president of Standard Oil Co. of British Columbia, Ltd., director, was not present.

Floyd B. Inks, Jr., petroleum engineer for Gulf Refining Co., has been transferred from Krotz Springs to Lafayette, La.

H. D. Austin, engineer for Phillips Petroleum Co., has been transferred from Oklahoma City to Burbank field, Oklahoma.

John W. Spragg has resigned as district geologist for Western Natural Gas Co. in the Four Corner area. He will become a consulting geologist in the area and be associated with O. J. Lilly, Farmington, N. M., consultant.

E. P. Neal has been appointed chief geologist and director of exploration for Toklan Royalty Corp. and its affiliated companies. He formerly was regional geologist for the Tulsa district of Tide Water Associated Oil Co. He served 13 years with Shell Oil Co. before joining Tide Water in 1937.

Walter D. Rose, Houston engineering consultant, has been appointed senior research engineer for Continental Oil Co. in its development and research department at Ponca City, Okla. **Dr. John N. Dew** and **Dr. Philip E. Bocquet,** both recent chemical-engineering graduates of the University of Michigan, Ann Arbor, have been appointed research engineers in the department.

W. E. Bird, Jr., party chief for Continental Oil Co., has been transferred from Anadarko to Cherokee, Okla.

E. E. BRAND

CUBICCIOTTI

Edgar E. Brand has been elected vice president of L. Sonneborn Sons, Inc., New York refiners. He formerly was assistant vice president. **Rudolph Cubicciotti** has been promoted from general manager to vice president, and **Dr. Henry Sonneborn III** from assistant secretary-treasurer to secretary.

J. Anthony Marcus, Scarsdale, N. Y., has been elected president of Standard Petroleum Corp., which produces oil in Nebraska. Marcus is president of the Institute of Foreign Trade of New York.

L. A. Payne, driller for Bay City Drilling Co., has been transferred from Rock Springs to Crystal City, Tex.

Frank M. Wood, Wichita Falls, Tex., producer and drilling contractor, has been elected a director of the Fort Worth National Bank. He is president of Frank Wood & Associates, Inc., and is a partner in the W & A Drilling Co. He also is a director of the First National Bank of Wichita Falls and of the Texas Mid-Continent and the North Texas Oil and Gas Associations.

Glenn H. Pickett, tool pusher for Guy Mabee Drilling Co., has been transferred from Stanton to Brownfield, Tex.

J. D. McConnell has been appointed general manager of crude lines for Sinclair Pipe Line Co., Independence, Kans. McConnell, who recently has been in charge of the construction of Sinclair's new big-inch crude line to Chicago, will serve as an assistant to **G. M. Johnson,** vice president and director in charge of crude lines. McConnell's service with the pipe-line industry dates back to 1920 when he

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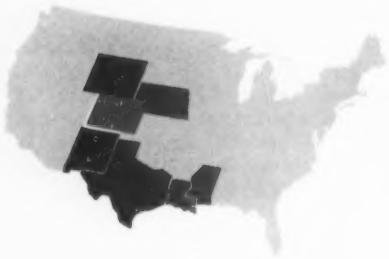

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PERSONALS

joined Sinclair's predecessor, Prairie Pipe Line Co.

Dr. H. H. Storch, chief of the Bureau of Mines' fuels technology division at Pittsburgh, has been appointed chief of the bureau's synthetic liquid fuels division at Washington, D. C.

C. L. RITTER

Carl L. Ritter has been promoted from assistant director to director of Continental Oil Co.'s natural gasoline and gas division at Houston. He succeeds **J. R. Bailey,** who has resigned to accept a position with Mene Grande Oil Co. in Venezuela. He has been with Continental since his graduation from Colorado A. & M. College at Fort Collins in 1935.

James R. Teel, production engineer for Skelly Oil Co. at Monahans, Tex., has been transferred to Tulsa as a petroleum engineer.

Walter H. Martz has been transferred from Enid, Okla., to Wichita as district geologist for Champlin Refining Co.

G. H. B. Davis, formerly director of Standard Oil Development Co.'s research division, has been named to the company's executive staff as coordinator of marketing services and contacts at New York.

John Alderman has joined Edwin L. Cox at Healdton, Okla., as production engineer for southern Oklahoma. He formerly was with Atlantic Refining Co. in Sholem Alechem field.

H. G. Fair, formerly superintendent of the Kansas City, Kans., refinery of Phillips Petroleum Co., has been promoted to vice chairman of the company's operating committee. **Paul J. Parker,** secretary and assistant treasurer, and **R. N. Sears,** assistant to the executive staff, have been appointed members of the operating committee. **V. C. Cavin,** formerly assistant superintendent of the Phillips, Tex., refinery, has been promoted to superintendent of the Kansas City refinery. **K. A. Anderson,** formerly mechanical superintendent at the Phillips refinery, has been promoted to assistant superintendent, replacing Cavin at Phillips.

Amos D. Elliott has been transferred from Alma, Kans., to Falls City, Neb., as local foreman for Skelly Oil Co.

W. B. Emery II, district engineer for Ohio Oil Co., has been transferred from Sidney, Neb., to Bakersfield, Calif.

Ben H. Ullom, tool pusher for Penrod Drilling Co., has been transferred from Ray, N. D., to Kermit, Tex.

Frank B. Bateman has been elected a director of Jupiter Oils, Ltd., Toronto. Bateman, a New York investment broker, also is a director of British Empire Oil Co., Ltd.

James F. Boudreau has been named president of the newly incorporated St. Anthony Development Co., Tulsa. He formerly was general manager.

A. J. Smith, formerly an engineer for Panhandle Oil Corp., has been appointed an engineer for Colorado Interstate Gas Co. at Colorado Springs.

M. M. Myers has been appointed an instrument engineer for Kerr-McGee Oil Industries, Inc., at Wynnewood, Okla. He formerly was with Peppers Refining Co. at Oklahoma City.

J. T. Clark has been appointed district geologist for Phillips Petroleum Co. at Amarillo, Tex., succeeding **A. C. Hornaday,** resigned. He has been serving as assistant division geologist at Bartlesville, Okla., and prior to that was district geologist at Jackson, Miss., for 5 years.

John T. Osborn has been elected treasurer and **James T. Noel** has been elected controller for Platte Pipe Line

J. T. OSBORN

J. T. NOEL

Co., Kansas City. Osborn formerly was assistant treasurer, and Noel formerly was chief accountant. Both men were with Service Pipe Line Co. before joining Platte in late 1951.

Morris L. Etheredge, petroleum engineer for Stanolind Oil & Gas Co., has been transferred from Houston to Corpus Christi.

Chester Couch, master mechanic at Socony-Vacuum Oil Co.'s Olean refinery, has been transferred to Bombay, India, to assume the duties of assistant maintenance superintendent of the new Standard-Vacuum refinery now under construction.

DEATHS

Herbert H. Lewin, 76, retired vice president of Apex Petroleum Corp., died recently at Long Beach.

D. F. McMahon, Sr., 73, independent operator and royalty buyer, died May 1 in a Tulsa hospital. Prior to becoming an independent in 1926 he was vice president of Evangeline Oil Co., general superintendent for Louisiana and assistant manager of the fuel-oil department for The Texas Co., and manager of Southwestern Petroleum Co. at Tulsa.

Delma Penn, 68, retired lease foreman for The Texas Co., died May 3 in a Tulsa hospital.

Don Hagler, Sr., 76, who had been in the oil-well-supply business since 1899, died May 2 at Houston. He had been with Hughes Tool Co. the past 11 years.

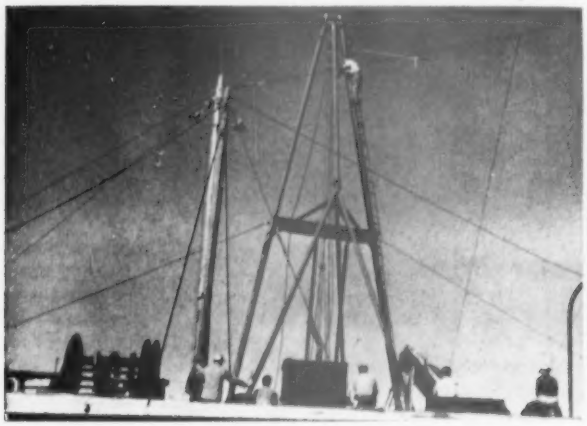
William L. McLaine, 79, who retired in 1938 as a director of production and vice president of General Petroleum Corp., died May 1 at his home in Los Angeles. He was the inventor of numerous devices used in drilling and production techniques. He founded and was the honorary president of Petroleum Production Pioneers.

William B. Gribble, 77, Parkersburg, W. Va., pioneer cable-tool driller and veteran of West Virginia oil fields, died at Akron, Ohio, recently. He retired from Parkersburg Rig & Reel Co. last January and formerly had been with Royal Dutch-Shell in Borneo, Sumatra, and Java, and had seen service in Mexico and Canada.

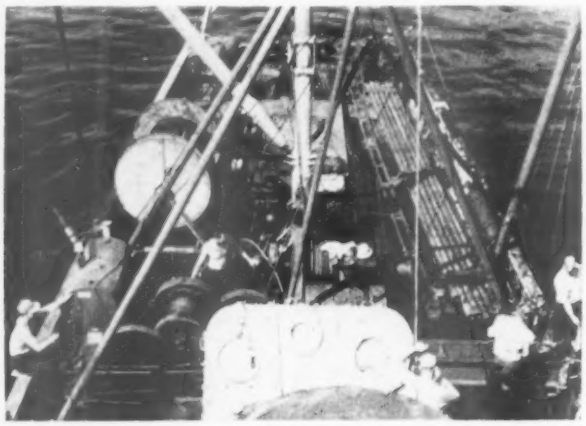
OFFSHORE CORE DRILLING

by D. H. Stormont
West Coast District Editor

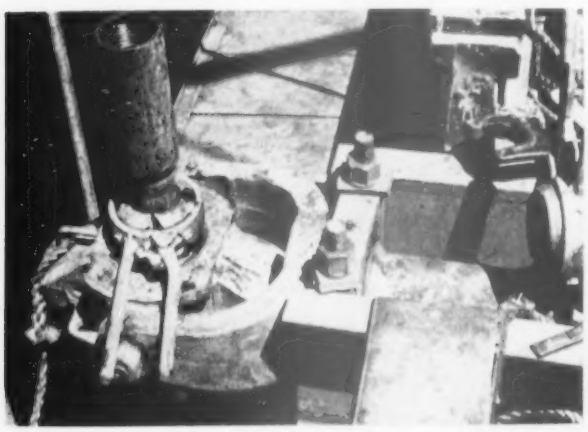
1 The "Myrnalynn" anchored at an established core point offshore from southern California. The core boat, a 136-ft. converted mine sweeper, worked in waters as shallow as 15 ft. and as deep as 1,100 ft. Coring was conducted to determine the age of rocks outcropping beneath the Pacific, to supplement data gained from seismic operations.



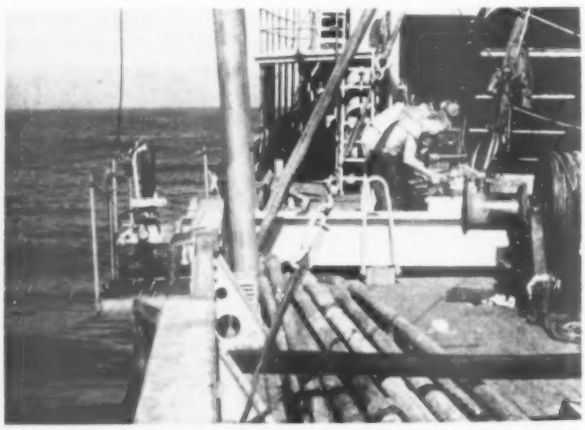
2 Drill-pipe coring was carried out using this 40-ft. A-frame, legs of which are 6-in. pipe and braces of 4-in. To offset high mast and to gain greater stability while jetting and coring were under way, 40 tons of ballast was carried. Two gasoline-engine-powered winches, each holding 1,500 ft. of either $\frac{5}{8}$ or $\frac{3}{4}$-in. wire line, provided the lifting power.



3 Coring equipment was concentrated on the ship's stern. Water for jetting the drill pipe was picked up by a suction pump, boosted to 300 psi. in a centrifugal, and then discharged into the 3-in. i.d., 1,000 psi. burst pressure rubber hose shown leading from the reel. Drill pipe, shown racked near one leg of the mast, was moved with the assistance of a trolley traveling on the tracks adjacent to the pipe.

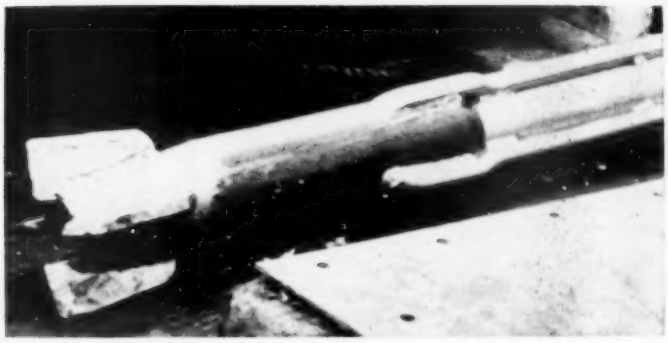


4 The amount of pipe believed necessary to penetrate overburden was made up before jetting was started. Here pipe is shown in position ready to be lowered after hose and core-cutter assembly is added. Working platform was extended beyond deck so that pipe string would not bump sides of the ship during normal rolling.

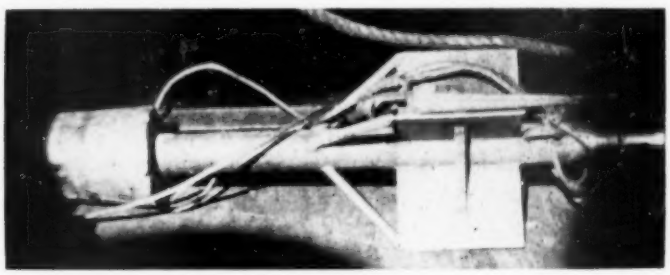


5 Conventional lightweight slips were used to suspend the pipe while the drill string was being made up or broken out. Note the provisions in the pipe holder and yoke for permitting the pipe to swivel both longitudinally and transversely. After the pipe was dropped overboard the slips were replaced by a rope socket.

6 Water hose being connected to the coring string prior to the pipe being lowered to bottom. A core cutter was retained in the joint above the hose connection until sufficient hole had been made to reach formational material. The cutter then was dropped to bottom and after a 2-minute interval, for exposing the orientation photo, 3 to 10-in. cores were cut.



7 The fish-tail core head used in drill-pipe coring was incorporated with a 10-ft. stainless-steel removable core-barrel assembly. The core catchers, $1\frac{1}{2}$ to 3 ft. in length, were equipped for using various types of heads, in accordance with the type of formation being cored. A single-shot camera housed in the upper assembly included a scribe line for orientation of the core and photo.



8 This drop coring device, labeled "cookie puncher" by the crew, was used for coring where there was no overburden and in water too deep for drill pipe. Weighted with lead on the bottom end, the stainless-steel device weighed 800 lb. Core cutters from $1\frac{1}{2}$ to 3 ft. long were used with the device, to give it an over-all length of about 8 ft. A camera assembly was incorporated so that the cores could be oriented and dip of the formations thereby determined.

. . . Here are typical activities during a day's operations

CALIFORNIA oil companies in recent years may not have been able to evaluate offshore prospects with the drill, because of the dispute in ownership of the near-shore submerged lands, but their exploratory work has been continuing.

One phase of activity has been the extensive core-drilling operations carried out to determine the age of formations outcropping beneath the Pacific Ocean along the coast of southern California. Carried out in waters up to 1,100 ft. in depth, the core data obtained offer a valuable supplement to those gained from seismic operations.

The activities of one three-company group were described and illustrated by R. R. Knapp, micropaleontologist for Standard Oil Co. of California, at a recent meeting of the Pacific section of the American Association of Petroleum Geologists. Knapp had been aboard the core boat for 15 months as oil-company representative, to see that formational material was cored and not recent overburden.

In addition to Standard, the activities were conducted for Humble Oil & Refining Co. and General Petroleum Corp. Coring techniques were developed by United Geophysical Co., which also supplied the crew and equipment.

In a typical day's operation, first the surveyor went out to establish the core point, shooting in the position from shore targets. The core boat then came in and anchored as close as possible to the surveyor's boat. How coring was conducted, either with drill pipe or a drop coring device as the water's depth and amount of overburden on the ocean floor dictated, is illustrated and described in the accompanying photographs and captions.

9 This orange-peel bottom sampling device was used for obtaining samples of the overburden lying on the ocean floor. Prior to being lowered the sides were triggered to an open position. After being lowered to bottom the device was tripped, causing the four segments to close and seize a sample of the bottom sediments. The sampler then was hauled to the surface by the gasoline-engine winch.

GAS LIFT . . . Adjusting controls at well head. Here are the author, left, with R. Z. Mendenhall, district sales supervisor, Guiberson Corp., and Lloyd Suitts, chief switcher, Plymouth Oil Co. (Photo courtesy Plymouth Oil Co., Will Thompson.)

Gas Lift Used to Produce Plymouth Field Wells

... to remove salt water within well bores
... to induce wells to flow at allowable rates
... to keep sand moving at all times.

by David M. Crawford

IN Plymouth field, north of Corpus Christi, Tex., there are a number of dually completed oil wells. Many of them are now flowing naturally from both zones. However, because of the increasing encroachment of salt water and declining reservoir pressure, there is a tendency for some of the wells to log up with salt water and die when flowed through a choke sufficiently small to produce at allowable rates. These wells also make a large amount of sand, which would naturally tend to settle when the well died.

To overcome these difficulties, Plymouth Oil Co. decided to use gas lift on three of its wells as a means of:

1. Removing the accumulated salt water within the well bores.
2. Inducing the wells to resume natural flow at allowable rates.
3. Keeping the sand moving at all times.

Plymouth Oil engineers set up several requirements for such a gas-lift system. They had to consider several factors in making a selection of the type to be used. These requirements and factors were: (1) simplicity of installation and operation; (2) installation costs; (3) accurate measurement of injected and produced gas for each individual zone; and (4) the mechanical difficulties encountered and time consumed by a system composed of either two or more parallel strings of tubing clamped together, or concentric strings with flow valves on the inner string (which requires numerous field-cut threaded connections).

In order to meet all of these requirements and factors, a system designed by Guiberson Corp. was selected, using concentric strings of tubing with flow valves on the outer string in which the upper or strongest zone would flow through the inner tubing string, and the lower or weakest zone through the annulus formed by the inner and outer strings.

Fig. 1 shows schematically the arrangement of the outer tubing and inner tubing, or macaroni, and associated surface control equipment. The motor valves and controls are arranged to inject gas automatically into either tubing string when the surface flowing pressure of either zone drops below a desired minimum. The salt water used to kill the well during workover is removed from both zones by the use of only one flow valve in the macaroni string and the customary minimum number of flow valves on the tubing.

Compared with the other dual-completion systems, the use of one valve for the macaroni greatly simplifies the installation since only one field-cut threaded connection must be made and only one change of tubing slips and elevators is necessary.

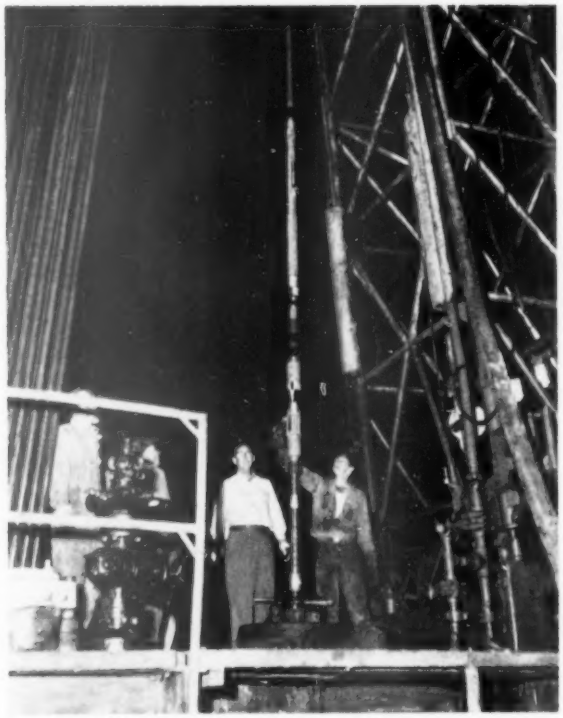
When installing the valves, a cup-type packer is run between the zones with enough tubing above it to span the upper zone perforations. An assembly as shown in photograph—consisting of a "crossover" nipple, a hook-wall packer, a dual-completion mandrel with a 925-psi. type "A" flow valve, and a regular type "A" mandrel with an 850-psi. type "A" flow valve—is then added to the tubing string. This assembly, made up in the field, is picked up as easily as a joint of tubing. The remainder of the tubing string is then run in the conventional manner.

Next, the packer is set and the tree installed. The macaroni string with a seating-cup assembly on the lower end is run without interruption and landed in the dual-completion mandrel. The top of the macaroni string is hung from the tree by a special head nipple.

After the macaroni string is run, it is customary to test both packers and the seating-cup assemblies for leaks. With the well filled with salt water, the upper packer is tested by closing the tubing master valves and applying hydraulic pressure to the macaroni. A return of fluid through the casing indicates a leak. The seating-cup assemblies are tested by closing the casing master valves and opening the tubing. Pressuring the macaroni will cause a return of fluid through the tubing if there is a leak. The lower packer is tested by

THE AUTHOR

David M. Crawford, seen in the photograph at left, is petroleum engineer for Plymouth Oil Co. in the Sinton, Tex., office. He is a native of Parkersburg, W. Va., and following 3 years of service in World War II, he attended Princeton University for a year, and Colorado School of Mines for 4 years, graduating in 1951 with a degree in petroleum engineering. He immediately joined Plymouth, working in both the drilling and production phases of the company's operations.



Delmar Burris, Guiberson representative, is supervising dual-completion equipment hanging in derrick ready for installation. (Photo courtesy Guiberson Corp., engineering department.)

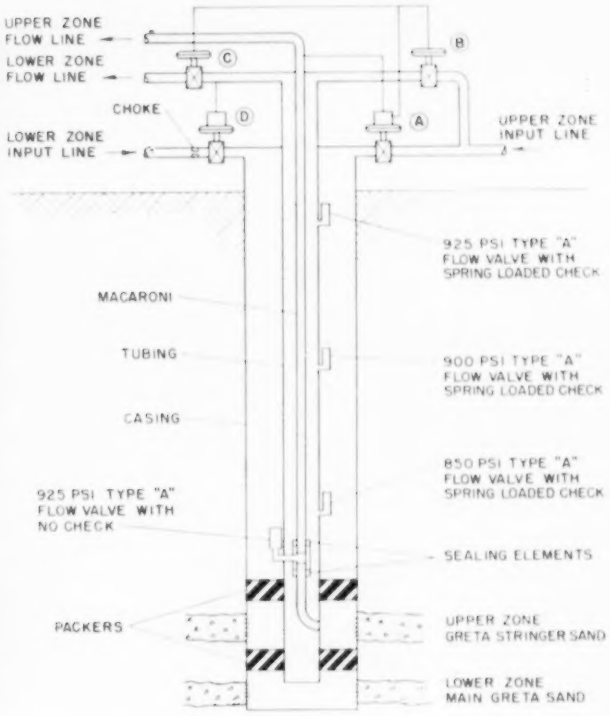


Fig. 1—Schematic arrangement of dual-completion gas-lift system.

closing the casing master valves and pressuring the tubing. A fluid return through the macaroni indicates a leak.

To unload salt water from the well, gas pressure is applied to the casing and macaroni simultaneously. The tubing flow line is left open to a surface pit or a low-pressure separator. The macaroni flow valve is open because of the hydrostatic head above it, and this valve has no reverse-flow check valve, which establishes communication from the casing to the macaroni.

As pressure is built up, the fluid is forced down simultaneously in the macaroni casing, through the three valves in the tubing string, and up the tubing annulus to the surface. When the fluid level within the casing annulus reaches the top flow valve, gas enters the tubing and lifts the column of salt water to the surface. Unloading then proceeds in the conventional manner until the lowest flow valve on the tubing string is uncovered. Gas pressure may then be bled off the macaroni, and the well is ready to be placed on automatic control for gas lifting.

At the present time in Plymouth field there is a tendency for both zones to flow naturally, and the surface control equipment injects gas only when either zone requires it to maintain flowing conditions. In the future, when salt water increases and formation gas and reservoir pressures decrease making straight gas lift necessary, a simple change in motor valve control units will be required. A time-cycle intermitter will replace the pressure-control unit. The intermitter will be set to inject gas at regular intervals and supply the amount of gas necessary to keep either or both zones producing at the required rate.

With both zones flowing naturally (Fig. 1), motor valves **A, B,** and **D** will be closed and motor valve **C** will be open. When the lower or weaker zone begins to "log up" and tends to die, the flowing pressure at the tubing head will fall. As this flowing pressure falls below the selected setting of the pressure control unit on motor valve **D,** the diaphragm pressure of motor valve **D** will be bled off and the motor valve will open. Gas from the lower-zone input line, or meter loop, will build up casing pressure to the opening pressure of the 850-psi. valve in the tubing string and gas will be injected. As aeration takes place in the tubing, the flowing tubing head pressure of the lower zone will increase and actuate the pressure-control unit of motor valve **D,** thereby closing it.

Should the upper zone tend to die, the pressure control unit or motor valve **A** will be actuated by the falling surface pressure of the macaroni string. Motor valves **A** and **B** will open and **C** will close, permitting gas from **B** to back pressure the tubing. Gas from motor valve **A** builds up casing pressure to the opening pressure of 925-psi. valve in the macaroni and gas is injected.

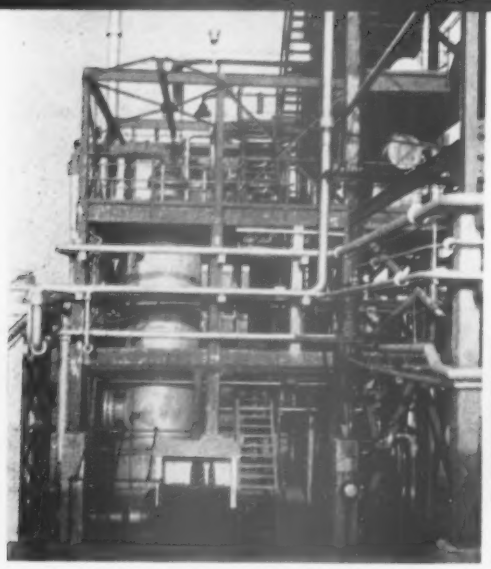
Although the tubing valves are lower-pressure valves than the macaroni valve, gas will not pass through them when the tubing string is back pressured. Backflow of tubing fluid into the casing cannot take place because the tubing valves are equipped with spring-loaded, reverse-flow checks. When the flowing surface pressure of the macaroni has been reestablished, motor valves **A** and **B** will close and **C** will open.

Recording gas-flow meters measure injected and produced gas for each zone and permit accurate calculation of gas-oil ratios. These installations have been approved by the Oil and Gas Division of the Texas Railroad Commission.

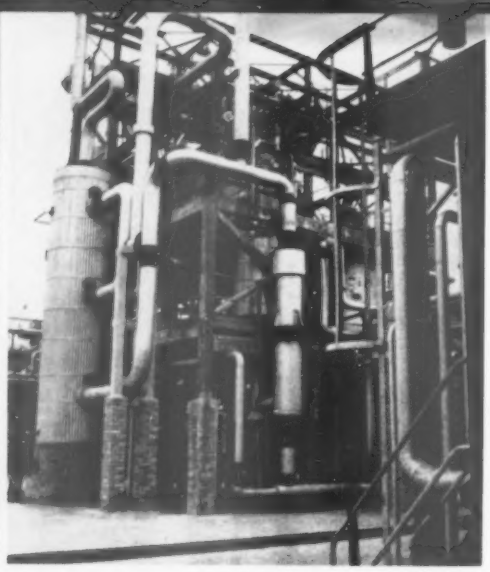
BOOK

GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEMS. Published by American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York. $1.25.

This booklet is Section 8 of American Standard Code for Pressure Piping, A.S.A. It prescribes minimum requirements for the design, fabrication, installation, testing, and operation of piping systems for conveying substantially noncorrosive combustible gases.



AUTOFINING REACTOR at the Llandarcy refinery of National Oil Refineries, Ltd., is at left in this photograph. Product coolers are at top right.



KNOCKOUT COLUMN for Autofining process is at left, waste-heat boiler is in center, and reactor is in right background in this photo of the unit.

PROGRESS REPORT . .

DESULFURIZATION via AUTOFINING

at National Oil's Llandarcy refinery

TYPICAL results from the Autofining unit at National Oil Refineries, Ltd., Llandarcy, South Wales, show that 83.6 per cent of the total sulfur is removed when treating kerosine and that 97.9 per cent of the total sulfur is removed when treating naphtha.

This first commercial Autofining unit has been in operation since July 1952. Capacity of the unit is 3,500 bbl. per stream day.

The process, developed by Anglo-Iranian Oil Co., has been proved in extended operations in a 350-bbl. per day pilot plant. *(See The Oil and Gas Journal, issues of March 17, 1952, page 169, and September 8, 1952, page 67.)*

Operation results . . . In the Llandarcy unit the feed stock and the recycle gases are heated in separate heaters and pass downward through the reactor. The hot vapors from the reactor pass through a waste-heat boiler, where steam is generated; after heat exchange and cooling, the products flow to the separator from which the recycle compressor takes suction.

If it is desired to meet a color specification with products such as kerosines, the products leaving the waste-heat boiler pass into the knockout tower where about 1 to 2 per cent volume of heavy ends are removed. Any excess gas make is passed to fuel from the product separator.

Liquid product from the separator passes to a flash-tower stabilizer to remove the hydrogen sulfide and other gases which results in flash-point rectification. The stabilizer product is normally free of hydrogen sulfide but a light caustic soda wash is given to guard against poor stabilizer operation.

The design conditions for this unit on either feed stock are:

Pressure, psig.	100
Reactor temperature, °F.	780
Space velocity, v./v./hr.	3.0
Gas recycle rate, std. cu. ft./bbl.	2,000

and the following data are typical of the results obtained when operating under these conditions.

Utilities

The consumption of utilities in the unit under full design conditions is:

150-lb. steam, lb. per hour (net)	6,600
Cooling water, Imperial gal. per hr.	30,000
Fuel, million B.t.u. per hour	25
Electric power, kw.	10

In this plant, the recycle gas compressor is driven by the steam generated in the waste-heat boiler.

KEROSINE PRODUCTION

	Feed stock	Product
Specific gravity, 60°-60° F.	0.824	0.820
Gravity, °A.P.I.	40.2	41.1
I.b.p., °F.	309	298
10 per cent volume, °F.	336	329
50 per cent volume, °F.	383	381
90 per cent volume, °F.	460	453
F.b.p., °F.	511	496
Sulfur, per cent weight	0.645	0.106
Sulfur removal, per cent		83.6
Color Saybolt	+10	+21
Corrosion (Cu strip at 212° F.)	Pass	Pass
Octane number (M.M.), clear	43.5	47.0

Approximately 1.5 per cent volume bottoms was removed in the knockout tower.

NAPHTHA PRODUCTION

	Feed stock	Product
Specific gravity, 60°-60° F.	0.780	0.780
Gravity, °A.P.I.	49.9	49.9
I.b.p., °F.	302	293
10 per cent volume, °F.	318	318
50 per cent volume, °F.	338	338
90 per cent volume, °F.	374	372
F.b.p., °F.	408	412
Sulfur, per cent weight	0.143	0.003
Sulfur removal, per cent		97.9

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You can always be sure of fast action when you call Ryerson for steel. Sure that your requirements will get prompt, interested attention.

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FARNHAM

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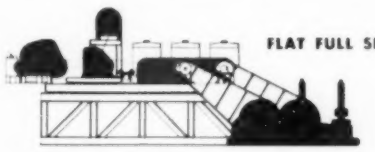
GREATER FLEXIBILITY AND OPERATING ECONOMY

"Packaged" design of the J-1100 and J-1400 permits a set up to meet any drilling requirement. (See the sketches below). This versatility makes these big Emsco rigs ideal for barge installations, assuring greater economy and better distribution of weight.

The separate selective speed transmission enables the operator to place engines and compounding transmission at ground or derrick floor level, or at any intermediate height. This makes possible short drives to the drawworks, compounding transmission and pumps.

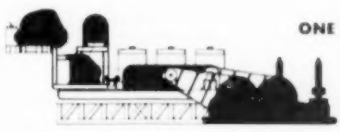
The J-1100 and J-1400 are available with mechanical, fluid coupling, electric coupling or torque converter drives. Controls are in a separate driller's console. Pump drives are pedestal-mounted, and clutches are mounted on ends of shafts for easier servicing.

Call CONTINENTAL for details about Emsco's big versatile power drilling rigs.



FLAT FULL SET

Generally used for offshore barge and piling locations. Drawworks, selective speed transmission and compounding transmission are set at derrick floor level, and optional sand reel on a light sub-base directly above selective speed transmission.

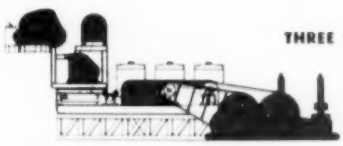


ONE STEP

Drawworks is set at derrick floor level, selective speed transmission and compounding transmission at an intermediate level. Slush pumps are set at ground level with optional sand reel on sub-base above selective transmission.

TWO STEP

Most common arrangement. Compounding transmission and slush pumps are set at ground level, selective speed transmission at an intermediate point, and drawworks at derrick floor level. Optional sand reel is set on sub-base directly above selective speed transmission.



THREE STEP

Special setting for deep drilling and where heavy blow-out preventers and 14 to 20-foot substructures are required. Drawworks, selective speed transmission and compounding transmission are set at three levels, the latter on 3 to 7-foot sub-bases. Slush pumps are at ground level.

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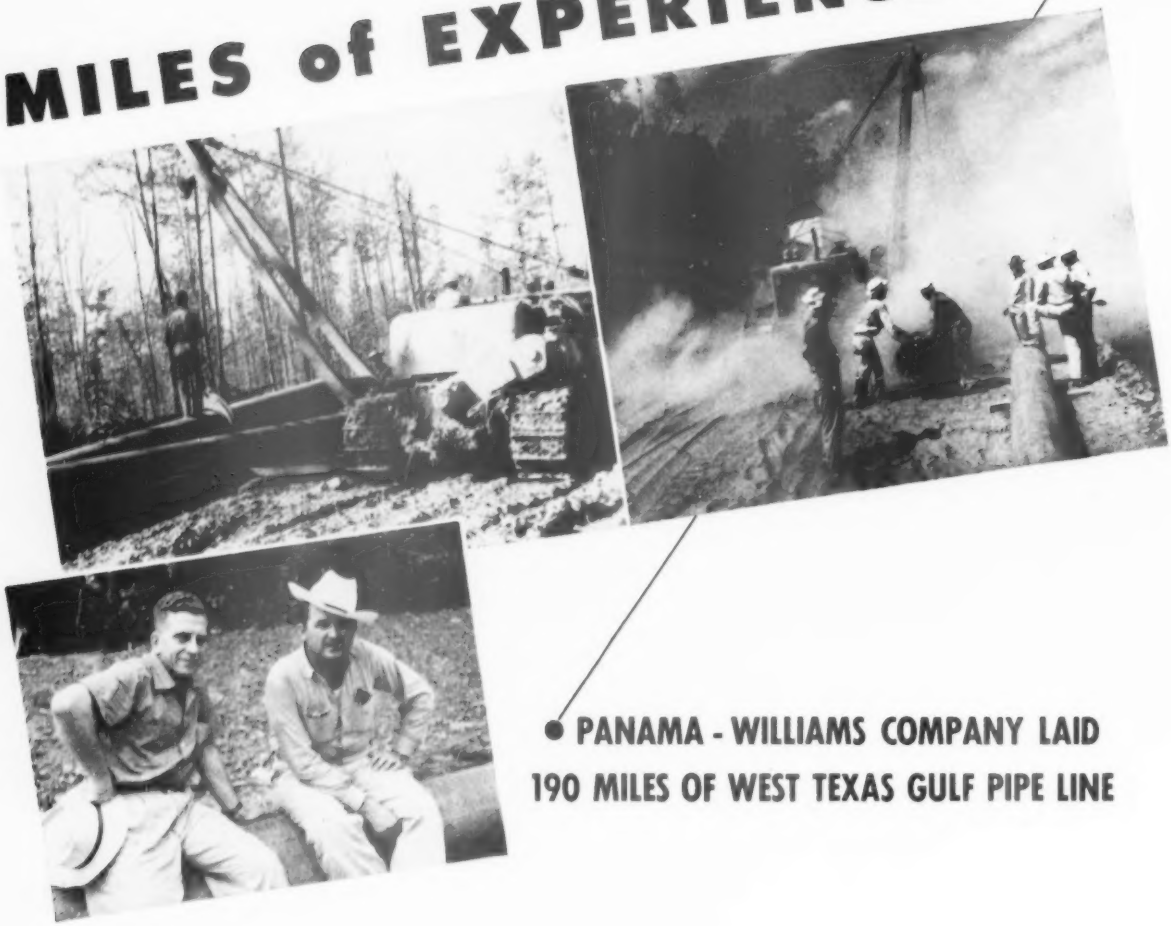
MILES of EXPERIENCE . . .



● PANAMA - WILLIAMS COMPANY LAID 190 MILES OF WEST TEXAS GULF PIPE LINE

● This largest diameter crude oil pipe line ever built called for the utmost from men and machines through the long, hot, dry summer and the wet winter over the forty miles of 20-inch pipe laid from Wortham, and the 150 miles of 26-inch pipe laid between Centerville and Nederland. Mile after mile through the blowing dust and sand of summer and the mud and cold of winter the experience of our top men assured completion in the minimum of time.

With Panama-Williams Company spreads your line will be laid the way you want it.

PANAMA-WILLIAMS COMPANY

PIPELINE CONTRACTORS

HOUSTON

PUMP STATIONS on West Texas Gulf line are electrically controlled for sequence operation from console control desk. Console-desk diagram shows valving with indicating lights. Bay window in control room provides operator with full visibility of pump room.

WEST TEXAS GULF PIPE LINE

Largest-Diameter, Biggest-Capacity Crude Line

Ultimate capacity of this 26-in. carrier will be 440,000 bbl. per day. Six semiautomatic pumping stations total 29,800 hp.

by Paul Reed
Pipe-Line Editor

THE West Texas Gulf Pipe Line Co.'s project put in operation this year has the largest diameter and largest capacity of any single-line crude-oil system in the country.

This $42,000,000, 577-mile trunk line from West Texas to the Gulf Coast consists of 465 miles of 26-in. from Colorado City, Tex., via Wortham to Nederland, Tex., and a 112-mile spur line from Wortham to Longview, Tex. Construction started December 10, 1951; first deliveries began February 10, 1953. Initial capacity is 301,000 bbl. per day; ultimate capacity will be 440,000 bbl. per day.

West Texas Gulf Pipe Line Co. is owned by Gulf Refining Co., Sohio Pipe Line Co., Sun Oil Co., Pure Transportation Co., and Cities Service Pipe Line Co.

Five different types of crude will be handled. The line is a common carrier and is subject to all regulations governing such carriers.

Operating scheme . . . The line runs from Colorado City due east to Ranger and arcs to the south and east via Wortham to a terminal point outside Beaumont in the vicinity of the Louisiana border.

Crude oil enters the line at Colorado City from 10 connecting lines. The largest feeder line is the Mesa Pipe Line System, an 80-mile, 24-in. line from Midland to Colorado City. Mesa is owned by the same companies owning West Texas Gulf but the ownerships are in different proportions.

Officers of West Texas Gulf Pipe Line Co. are: J. H. Russell, president; David Proctor, J. L. Irvin, and W. J. Wilkins, vice presidents. W. L. Naylor is vice president and comptroller. P. O. Settle is secretary, and H. R. Moorhead, Jr., treasurer.

Engineering and construction for building the West Texas Gulf System were under the direct supervision of J. L. Irvin, general manager of operations.

Pump Stations

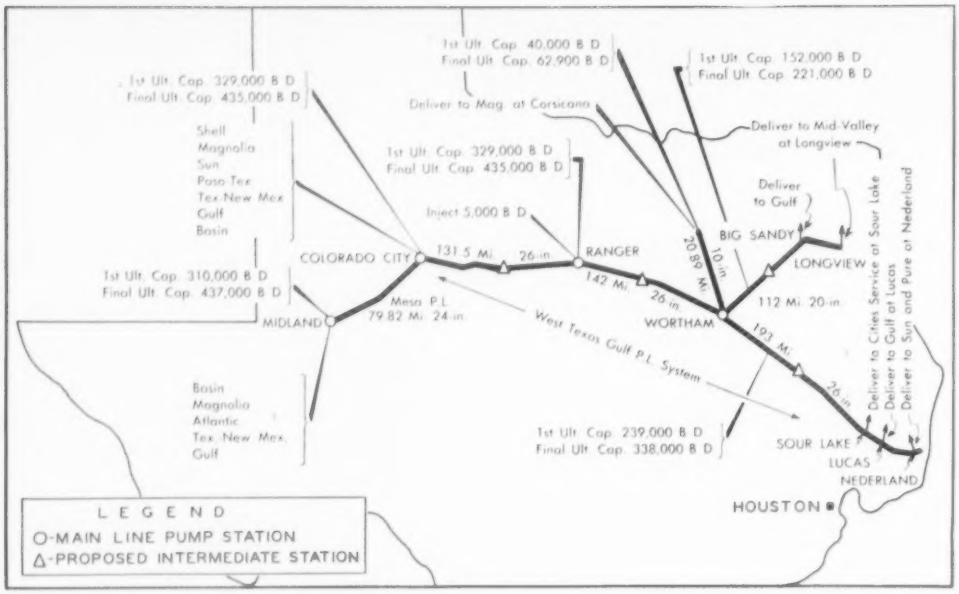
The three main pumping stations at Colorado City, Ranger, and Wortham have a total of 15,800 hp. The intermediate booster stations at Abilene, Blum, and Trinity will have a total of 14,000 hp. The total for all six stations of both types will be 29,800 hp.

Pumping stations are semiautomatic, controlled by push buttons and instruments. Line pressure at the Colorado City station discharge is approximately 750 psi. and suction pressure is 25 psi.

Units . . . The Colorado City and Ranger stations of the system are each equipped with four electric centrifugal pumping units which consist of forced-draft-ventilated, totally enclosed 4,160-volt, 3-phase, 60 cycle, 1,780-r.p.m. motors driving 16-in. double-volute, double-suction centrifugal pumps. Each station has four units including a 1,000-hp. motor driving single-stage pump and three 2,000-hp. motors driving two-stage pumps.

The Wortham station has 10 units for pumping through the Lucas, Longview, and Corsicana segments.

The four units for the Lucas segment are of the same type but different



MESA AND WEST TEXAS GULF pipeline systems, Midland to Nederland. Capacities are based on yearly weighted average crude. Line pressures are 775 and 750 psi., for Mesa and West Texas Gulf lines, respectively, with 25 psi. residual pressure in both cases.

horsepower from those at the Colorado City and Ranger stations. These include an 800-hp. motor driving a single-stage pump and three 1,500-hp. motors driving two-stage pumps.

The four units for the Longview segment include a 500-hp. motor driving a 12-in. single stage pump and three 1,000-hp. motors driving 12-in. two-stage pumps. The other motor and pump characteristics are the same as for units at Colorado City and Ranger.

The two units for the Corsicana segment include one 250-hp. forced-draft totally enclosed 4,160-volt, 3-phase, 60-cycle, 2,600-r.p.m. motor driving a 6-in. single-phase double-volute, double centrifugal pump, and one 500-hp. forced-draft-ventilated totally enclosed 4,160-volt, 3-phase, 60-cycle, 3,600-r.p.m. motor driving a 6-in. two-stage single-suction centrifugal pump.

Boosters . . . The three intermediate booster stations will each have one unit rated as follows: (1) Abilene and Blum, 3,000 hp., and (2) Trinity, 2,000 hp.

Controls . . . Stations are electrically controlled for sequence operation from a console control desk in a control-room section with a bay window protruding into the pump room for the sake of full visibility for the operator. In accordance with modern practice the console-desk diagram shows valving with indicating lights. Electric pressure strain gages are used to insure more accurate and safer service.

At stations having manifolds and tank farms a valve control panel of a similar type is adjacent to the console control desk. At this panel remote control is applied for manifold valves, tank-farm valves, and booster pumps.

Starting and stopping . . . Either at the console desk or locally, the operator can put on or take off pump units. Sequence starting controls insure safe progression through several steps: (1) Units will not come on until the cooling fan for the unit is in opeartion to insure the purging of ducts before the unit motor starts; (2) suction residual pressure setting allows the suction gate of the pump to open with discharge gate remaining closed until pressure in the pump has built up, at which time the discharge gate opens allowing the stream to pass to the next pump or to the main line, depending on the number of units desired for operation. This sequence of starting is typical of all units.

Safeguards . . . Operations are safeguarded by mercury switches which function under conditions of low suction, high case and high outgoing line pressures, high motor and pump-bearing temperatures, also high motor current motor winding, and high pump-case temperatures. An alarm sounds before the mercury switches function.

For pneumatic operation of instrumentation, air compressors are auto-

(Continued on page 122)

COATING AND WRAPPING operations during the laying of the West Texas Gulf line. Coal-tar enamel with minimum thickness of 3/32 in., followed by glass-mat wrapping and an outside wrap of 15-lb. felt, constituted the line coating.

Here's a suggested plan for

Increasing Ultimate Recovery in East Texas' Kilgore Townsite Area

by C. E. Wright

IN the vast East Texas oil field, 29,000 oil wells have been drilled on 13,000 acres situated in Upshur, Gregg, Rusk, Smith, and Cherokee counties. From the beginning, the development of this great oil field has been an amazing spectacle and even more amazing is an observer's first view of the many wells now producing within the city limits of Kilgore, Tex.

This article deals with a menacing salt-water problem confronting the operators within the Kilgore townsite. Remedial measures recommended to minimize the problem as well as substantially increase the ultimate oil recovery are presented.

Within the city limits of Kilgore there are 106 companies operating 1,186 wells. Of these, 782 are pumping and 404 are flowing.

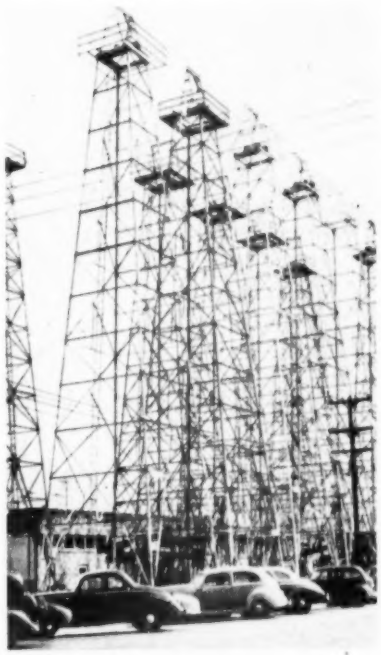
A list of major and independent companies operating 20 or more wells in the area is shown in accompanying table. Six hundred and eighty-one wells, or more than 50 per cent of the total number, are operated by only 16 companies. A complete list of all operators shows there are far more wells operated by independents than by major companies.

Data for Kilgore Area

In examining producing conditions within the city limits, it has been observed that there is a wide variation in reservoir pressure from the first to the middle of the month. This variation is caused by the manner in which allowable is produced from these wells.

By referring to production allocation summary in the table, it is seen that 1,186 city-limit wells receive a proration allotment of 23,265 bbl. of oil per day for an 18.75-producing-day month, or 14,632 bbl. of oil per 30-day calendar month.

It is quite probable that these wells produce at rates as high as 50,000 bbl. oil per day or more during the first few days of each month. With these wells situated in the path of encroaching salt water from the western side of the field as shown by the map in Fig. 1, this is an extremely bad situation. If this practice is continued, it will lead to the premature abandonment of a large number of wells and consequent loss of substantial oil recovery in the area.



It is inevitable that continuation of present operating practices within the city limits of Kilgore will cause salt water in great quantities to move in and take the area just as it did in part of Old London section of East Texas field, and much sooner than would be experienced under proper operating conditions.

Use of Chokes and Packers

To a limited degree, a few of the operators in East Texas field have been employing a production practice which is attaining phenomenal results in increasing recovery. This practice utilizes back pressure induced by application of bottom-hole chokes and production packers to both flowing and pumping wells. This is done in such a manner as to prolong withdrawal rates and permit only a slight drop in reservoir pressure while producing the allowable.

The objective of practically all such installations has been to prevent premature channeling and coning of salt water through the highly permeable Woodbine sand to the well bore, and to retard salt-water intrusion. It has been found that even after water had entered the wells equipped with bottom-hole choke, the rate of water increase in relation to oil produced has materially lessened, thereby prolonging the life of the wells and increasing their ultimate oil recovery.

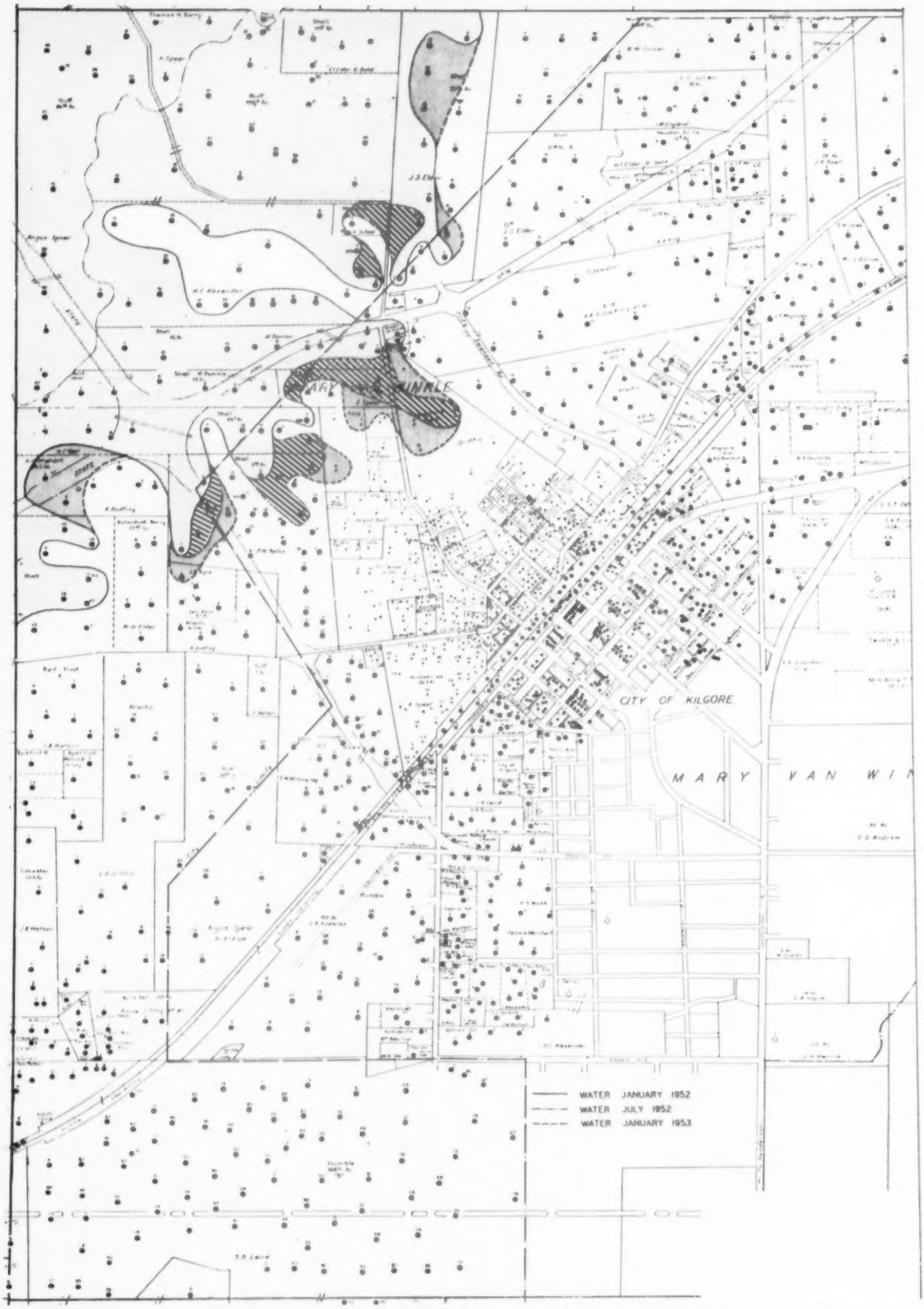
These bottom-hole-choke installations have been adapted almost exclusively to a relatively small number of wells located in the path of encroaching salt water from the western side of the field. Almost all of the wells were so equipped after salt water had intruded, not before.

To attain proper operating conditions within the Kilgore city limits, installation of the previously mentioned subsurface equipment is recommended for all pumping wells producing at a rate in excess of 50 bbl. oil per day each. Those wells producing at a rate less than 50 bbl. per day each are not considered detrimental to any plan directed at stabilizing reservoir pressure and should not, therefore, require chokes.

Bottom-hole chokes of a type acceptable to operators are recommended

THE AUTHOR

C. E. Wright, prominent engineer and oil production superintendent, is with Wrather Petroleum Corp., Kilgore, Tex. Previous affiliations have been with Indian Territory Illuminating Oil Co. in Seminole and Oklahoma City, 1927-36; British-American Oil Producing Co., Tulsa and Los Angeles, 1936-43; as a consulting petroleum engineer in California and Rocky Mountain areas, 1943-46; and with Arabian American Oil Co., Dhahran, Saudi Arabia, 1947-50.



EAST TEXAS, KILGORE AREA.—Within the city limits of Kilgore there are 106 companies operating 1,186 oil wells. Of these, 782 are pumping and 404 are flowing. Note water encroachment in northwest area.

for all flowing wells so as to limit production to a rate of 50 bbl. oil per day per well.

Chokes . . . A diagrammatic sketch of a typical bottom-hole choke and production packer assembly is shown.

The bottom-hole choke consists of a slotted seating nipple and inner assembly. The seating nipple is run just above either a hook-wall packer or retainer. The inner assembly with choke is run on and is removed with a rod pump. Size of choke may be changed at any time by pulling rods.

When the bottom-hole choke is placed in position in the well, fluid stands relatively high in the casing. The pump produces from the reservoir between tubing and casing above packer and from the formation. Formation fluid enters the choke so slowly that reservoir pressure is practically undisturbed. During the time the well is shut down, the casing reservoir again fills, but so slowly through the choke orifice that channeling or coning of formation water is greatly minimized, if not prevented.

Production rates . . . The question will naturally arise as to why it is necessary to use special equipment to limit withdrawal of production. One important answer is human element. There are a number of pumping wells within the city limits with pumping rates as high as 450 bbl. oil per day each. Likewise, flowing wells with rates as high as 30 bbl. oil per hour each are not uncommon.

Production from both flowing and pumping wells is subject to wide fluctuation without changing pumping speed or choke diameter. A pumper may put a well on with the intention of producing 20 bbl. oil, but he may get 20, 40, or 80 bbl. oil in the length of time he estimates to produce 20 bbl. It is therefore seen that it is impractical, if not impossible, to regulate production to fixed small withdrawal rates under present operating conditions.

Packers . . . Use of either packers or retainers in conjunction with chokes in pumping wells is essential to creating a reservoir from which to pump from, as the use of a choke without a packer would almost assuredly cause paraffin accumulation between tubing and rods in many wells. Furthermore, pumping from the reservoir above the packer will enable accurate withdrawal with high pump efficiency, even at very small daily production rates.

Objectives of Program

The objectives necessary to achieving maximum benefit from this proposed change in production practice for Kilgore city-limit wells are:

1. To put the program into operation at the earliest possible time and **before** water **enters** these wells where it is possible to do so, not **after.**

2. Equip each well so that it is impossible to operate at a rate sufficient to cause more than a minimum differential in reservoir pressure while producing its allowable. From a practicable standpoint, a limit of 50 bbl. oil per day per well is believed reasonable to start with.

3. Production schedules should be arranged so as to avoid any concentrated withdrawal from the area. A uniformly spaced maximum number of wells should be required to operate a maximum period of time while producing allowable. At no time should the daily production from the area exceed the average calendar-day proration allotment by more than 10 per cent.

The net result of such a revised operating program should be a permanent stabilization of reservoir pressure and consequent uniform advancement of salt water toward the city-limit wells.

To utilize statistical data in estimating the additional oil recovery to be expected from putting this program into operation is difficult for several reasons. The practice of using bottom-hole chokes in pumping and flowing wells in East Texas field has not been general enough and has been applied to only those wells where salt water was already present. Those operators who have had experience with wells where this type of equipment has been in use generally agree that the life of wells so equipped is prolonged an average of 2 years.

Estimates of Benefits

For the reason that the rate of water increase is lessened and life of wells prolonged by use of bottom-hole chokes, even in wells already showing salt water, and, by the logic of sound engineering principles, it is firmly believed that the entrance of salt water into city-limit wells can be retarded as much as 2 years by the early application of bottom-hole chokes.

To assist further in analyzing the probable results of putting the plan under discussion into operation, a study has been made of water-encroachment maps showing water ingress into wells by 6-month periods during the past 5 years. This information is believed to present as comprehensive a picture as is available of how and at what rate water is moving in.

A composite curve of more than 1,100 representative East Texas wells making salt water has been in use by the Texas Railroad Commission for some time to "curve out" and transfer allowable of certain marginal water wells to other wells or leases. From this curve, the amount of recoverable oil from the average East Texas well showing salt water can be estimated with reasonable accuracy.

From the known factors, the assumed factor of retarding water entrance 2 years with bottom-hole chokes and by compensating for close spacing,

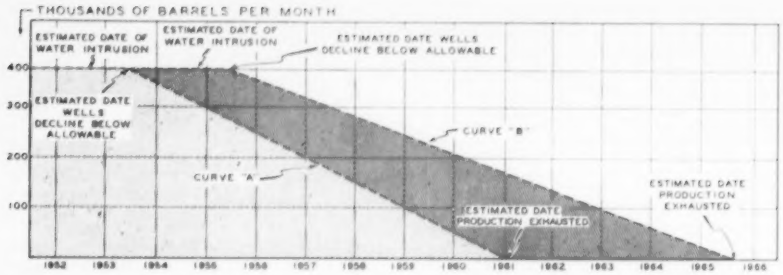
PRODUCTION ALLOCATION SUMMARY, KILGORE CITY-LIMIT WELLS (1952)

Wells classified—	No. of wells	Acreage	Allowable producing day	Allowable calendar day*
Marginal	57		707	707
Proratable	1,129		22,580	13,934
Total	1,186	1,863.32	23,265	14,631
Average marginal well			12.41	12.41
Average proratable well			20.00	12.50

*"Calendar-day allowable" based on average of 18.75 producing days per 30-day calendar month during 1952. In the calculations and estimates used in this report, it has been assumed that the 1952 average monthly allocation will remain unchanged during the remaining life of East Texas field.

ESTIMATED OIL RECOVERY BY PRESENT AND PROPOSED OPERATING PRACTICE—1,000 WELLS WITHIN KILGORE CITY LIMITS

Actual oil production, 1952—	Curve A (bbl.)	Curve B (bbl.)
Per day (30-day calendar month)	12,500	12,500
Per month	375,000	375,000
Per year	4,500,000	4,500,000
Estimated oil production to date, wells decline below allowable	4,500,000 (1 yr.)	13,500,000 (3 yr.)
Estimated oil production after wells decline below allowable	16,875,000 (7.5 yr.)	21,375,000 (9.5 yr.)
Total	21,375,000 (8.5 yr.)	34,875,000 (12.5 yr.)
Less		21,375,000
Estimated gain by proposed operating plan		13,500,000



Hypothetical composite production decline curves of 1,000 Kilgore city-limit wells. Curve "A" shows the anticipated performance of wells under present operating conditions; Curve "B" shows the anticipated performance of wells under system of operation employing use of bottom-hole chokes.

hypothetical composite production decline curves of 1,000 city-limit wells are shown in accompanying chart. The number of wells was reduced from 1,186 to 1,000 as a few of the wells are now making water. Additional wells are expected to show water before there is an opportunity to put the plan under discussion into operation, in the event such action is taken.

Curve A in the chart shows the expected performance of the wells under present operating practice. Curve B shows the expected performance of wells under the revised plan of operation herein discussed. Because of diverse factors, the time element, as well as production characteristics, are subject to variation not believed to be sufficient to cause more than minor distraction in the estimates and calculations used. From the hypothetical curves, however, Curve A indicates that, under present operating practice, salt water will start moving in by the middle of 1953; production will start dropping below allowable in 1954 and production will be exhausted by the middle of 1961.

Under the revised plan of operation, Curve B shows that water does not move in until 1955; oil production does not drop below allowable until 1956, and is not exhausted until the middle of 1965.

The effect of the two operating plans on production from the 1,000 city-limit wells is reflected in an accompanying table.

Assuming the hypothetical curves to be correct, it is pointed out that, by expeditiously putting this proposed change in production practice into operation, an increase of 13,500,000 bbl. in ultimate oil recovery is indicated for 1,000 wells in Kilgore townsite. Cost of equipping wells with proper choke assemblies is negligible and estimated not to exceed $500 per well unless casing repairs or other extraordinary work is needed. (At a cost of $500 per well, the cost of increased oil recovery figures $0.0365 per gross barrel.)

If a majority of operators agree that this proposed change in production practice appears to have sufficient attraction, it should not be too difficult to put it into operation for these reasons: (1) It will not work as a detriment to any operator; (2) it will be highly beneficial by increasing ultimate oil recovery at negligible cost; (3) it will materially reduce the over-all cost of salt water disposal by injection into the Woodbine reservoir; and (4) the Railroad Commission of Texas is known to be interested in and receptive to the conservation potentialities of any plan having necessary merit and practicability.

Acknowledgment

Permission to publish this article is through the courtesy of Wrather Petroleum Corp., Dallas.

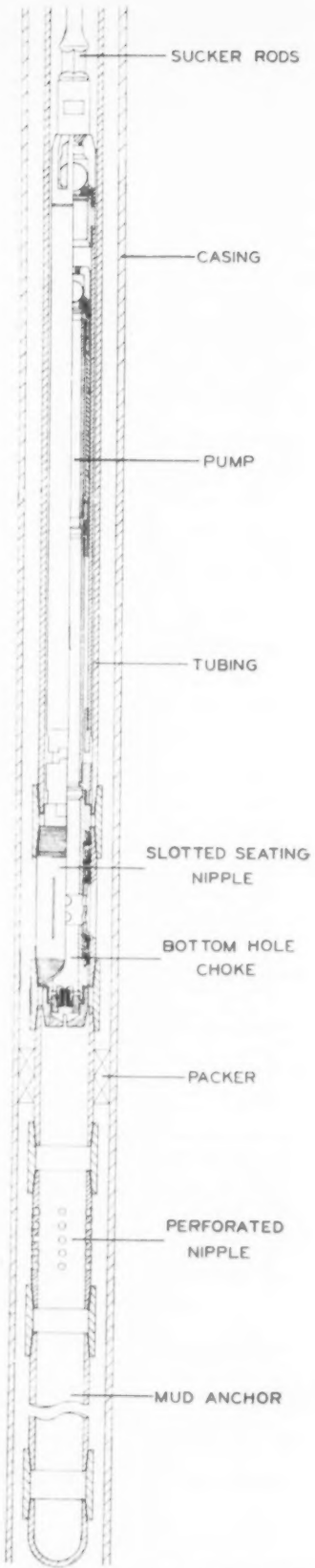
MAJOR AND INDEPENDENT COMPANIES EACH OPERATING 20 OR MORE WELLS WITHIN CITY LIMITS OF KILGORE

Major Companies

Name of company—	No. of wells
Shell Oil Co.	104
Humble Oil & Refining Co.	51
Magnolia Petroleum Co.	45
Gulf Oil Corp.	22
Tide Water Associated	22
Subtotal	244

Independent Companies

R. E. Smith	91
Tom Potter	56
Roger Lacy	50
John Wrather	41
Wrather Petroleum Corp.	35
Roosth & Genecov	35
General American Oil Co.	33
J. J. Jenkins	29
Pan American Prod. Co.	24
Producers Investment Co.	23
T. L. James Prod. Co.	20
Subtotal	437
Total of above 16 companies	681
Total of all 106 companies	1,186



Bottom-hole choke assembly for pumping wells.

New Light on

Removal of Flow Restrictions In Well Completions

by C. E. Clason*
and
Wayne F. Hower*

Mixture of dilute HCl and an organic sulfonic acid proves effective in increasing production in both sand and limestone by removing blocking materials

PHENOMENAL results from relatively small acid treatments in limestone formations or shooting in sandstone formations have demonstrated that both rotary and cable-tool-drilled wells have been plugged but a short distance from the well bore. This blocking action has lately been termed "skin effect," and its influence on the productivity of wells has been described in a recent article[1]. This skin effect, however, should not be limited to a small radius around the well bore as the blocking materials can penetrate highly permeable formations, crevices, and fractures to a considerable distance.

Any process or technique to reestablish as much of the normal permeability as possible must then consider the nature and causes of the blocking action. These causes vary from field to field.

Unless a well is drilled in with oil or an oil-base mud, the presence of water in the system is necessary and the unavoidable filtrate from a water-base mud can act in several ways to reduce permeability. Recent findings[2,3] have shown that drilling fluids can pentrate appreciable distances into oil-bearing formations. Mud losses, barely noticeable while drilling or running casing, may be sufficient to plug the well. Additional studies have disclosed that excessive pressures created during drilling and running of casing may often force large quantities of drilling fluids into the formation.

Fresh or salt water introduced during remedial operations penetrates the formation adjacent to the well bore, which can act to reduce the flow of oil. In some cases, oil-water emulsions are developed which form very efficient blocks to the flow of oil.

Formation fines and interstitial water accumulate in the formation near the well bore, which act to reduce the permeability of the producing formation to oil. Some contain varying quantities of bentonite which will swell by the adsorption of water and thus greatly reduce the diameters of the flow channels in the formation.

What can be done to alleviate these blocking conditions? A review of the foregoing discussion shows that water and/or bentonite are the chief causes of the reduction in permeability. Therefore, some means of removing the water or bentonitic drilling mud would restore the original condition existing before the penetration of the drill and thus permit an effective flow of well fluids to the bore. Several ideas for accomplishing the removal of the blocking materials were considered, but all of these were abandoned in favor of a chemical method. The object of the chemical method is designed to break water blocks, disperse muds, reduce the size of water-swollen bentonite particles, and destroy emulsions in the vicinity of the well bore. It was realized that actual dissolving of siliceous and bentonitic materials could not be achieved in appreciable amounts under actual well conditions. Therefore, the chemical action would have to produce a series of physical changes to accomplish the desired result.

Laboratory studies have shown that a mixture of dilute hydrochloric acid and a surfactant of the aromatic sulfonic acid class has a marked effect in increasing the effective permeability of sands containing bentonite.

The aromatic sulfonic acid is a very active surfactant and emulsion breaker. The recommended proportion of the foregoing chemical mixture has a low surface tension that falls in the range of 28.8 dynes per centimeter at 78° F. Such a mixture will penetrate mud filter cakes and bentonitic sand formations effectively, and thus contact a large quantity of bentonite.

The efficiency of the ion exchange is increased by this action; and the released water, having a low surface tension along with the original solution, is easily recovered from the treated horizon. The mud filter cake is not hardened by the ion exchange, but becomes dispersed as the exchange takes place, thus forming a fluid mixture very easily removed from the formation or the well bore.

Well-Treating Methods

The method of applying the chemical mixture to either new wells for initial production or to an established well to regain production, is usually a simple procedure. The volume of chemical solution for the treatment of a plugged formation depends primarily upon the thickness and porosity of the formation. However, 500 to 1,000-gal. treatments are the most popular. Some 250-gal. applications are known, as well as 2,500-gal. batches.

Plugging causes . . . If a fairly tight formation gave a good drill-stem test but was swabbed dry on completion, it can be assumed that the blocking material in the formation has not penetrated more than a few inches from the well bore. Therefore, a 250 to 500-gal. treatment would be recommended. If there is evidence that a large volume of mud has been lost to the formation, then it is advisable to use successive treatments to remove the blocking material.

Where a producing well needs rejuvenation a relatively large single-stage injection instead of successive small stages will gain in work time and give satisfactory results. Such a treatment usually is not for removal of large quantities of mud but for treatment of a bentonitic sand, or the removal of accumulated interstitial water and silt.

The foregoing discussion applies to producing horizons that have an effective thickness of not more than 20 ft. Thicker pays will naturally require a larger volume of the chemical mixture.

Procedures described . . . Actual application in a new well can be done

*Authors with Halliburton Oil Well Cementing Co., Duncan, Okla. From paper presented at spring meeting, Mid-Continent District, Division of Production, American Petroleum Institute, Tulsa, March 18-20, 1953.

through the well's production packer. Treating solution is placed in tubing and displaced with available fluids into formation, leaving perforated or open-hole section just covered with treating solution. The usual closed-in time is 1 to 2 hours, after which recompletion can follow. Where natural flow does not occur well conditions will require swabbing to remove treated blocking material and to start the flow of oil to well bore.

Treating old wells . . . The chemical mixture has been applied through tubing with rods in place, open-ended tubing, and where conditions demand, through a great variety of well-servicing tools and packers.

The chemical mixtue has been applied directly through the drill-stem testing tool in wildcat wells as an aid to prove the oil-production possibilities of a new formation. Such an instance recently occurred in a field in the northern part of Louisiana near the Texas border. A low-pressure chalk formation at 2,200 ft. gave a dry test. The chemical mixture was forced into the formation and the testing tool rerun to give a flowing test.

Field results in using this chemical treatment as a production stimulant have been encouraging. Many new wells have been made into good producers which otherwise would have been abandoned. Old pumping wells have been made to flow, and wells that have been dead for some time changed into economic producers.

It might be well to attempt to define a successful treatment. It might be said that a treatment that puts additional oil in the tank is the only type of successful application. However, if the pumping of the mud-cleanout material can quickly determine the oil productivity of a doubtful pay, money can be saved in future work. For example, a well producing from the Woodbine sand in East Texas field was treated with 500 gal. of the chemical mixture. Fluid production was changed from 0 to 60 bbl. of water per day. There was no doubt that the formation was cleaned of the plugging material and that no oil was available at that particular depth. Therefore, oil production after the formation has been cleaned of the plugging material will depend upon the oil in place and the pressure available to move it to the well bore.

In Refugio-Fox field, Texas, an old well completed in the Greta sand had produced until oil ceased to flow to the well bore. After a 500-gal. treatment of chemical solution, the well produced 30 bbl. of oil per day and 10 bbl. of water per day. Another well producing from the Slick sand near Pettus had originally been completed at 87 bbl. of oil per day and 9 bbl. of water per day. When natural production had dropped to zero, a two-stage treatment caused production to be 80 bbl. of oil per day with no water. Still another well, which was thought to have a very shallow block, was treated with only 100 gal. of the chemical mixture. The assumption was proved to be correct when oil production increased from 37 bbl. of oil per day, at a high gas-oil ratio, to 260 bbl. of oil per day, at a low gas-oil ratio.

An old well, producing from the sub-Clarksville formation in Spence field of East Texas, responded to a 250-gal. treatment by increasing from 0 to 36 bbl. of oil per day. A well producing from the Woodbine sand in East Texas field increased from 4 bbl. of oil per day to 87 bbl. of oil per day as the result of a 1,000-gal. treatment. Further work in the Woodbine along the east edge of East Texas field has been encouraging.

Three new wells were treated in Cree-Sykes field of Runnels County, Texas, that were completed in the Gardner sand. One well, with 14 ft. of pay exposed, was treated with 750 gal. and showed an increase from 24 to 64 bbl. of oil per day.

Another well responded to the same size treatment for an increase from 15 to 80 bbl. of oil per day. The third well, completed with 48 ft. of pay exposed, went from a trace to 140 bbl. of oil per day.

A new well in the Claytonville pool of Fisher County, Texas, producing from the Canyon reef, responded to a 500-gal. treatment by increasing from 360 to 1,200 bbl. of oil per day. This formation contains rather large openings that become plugged with mud during drilling. This was clearly demonstrated when the well flowed 300 bbl. of mud before the flow of oil started. Another new well completed in the Swastika sand of East Bartlett field in Jones County, Texas, went from 60 to 168 bbl. of oil per day after a 500-gal. treatment in 20 ft. of pay.

An interesting well can be cited from a field in Southwest Texas. A test of the formation showed pipe-line oil and a surface pressure of 1,065 psi. While the test was being pulled, the well started to kick and was killed with mud. Upon completion on a production packer, the formation would not give up any fluid. A 250-gal. treatment cleaned the formation of the blocking mud and pipe-line oil was soon flowing at 1,120 psi. tubing pressure.

A field near Seminole, Okla., generally, will not produce fluids until treated with the chemical mixture. A well in the Sycamore formation in Carter County, Oklahoma, responded to a 2,500-gal. treatment by going from a show to 150 bbl. of oil per day. Another well completed in the Layton sand, Logan County, Oklahoma, went from 2 to 30 bbl. of oil per day after a 750-gal. treatment.

Considerable success has been obtained with this material in the South Louisiana area. One well was making 26 bbl. of oil per day, 6 bbl. of water per day, and 960 M.c.f. gas through an open choke. Two weeks after treatment, this well was producing 80 bbl. of oil per day, 7 bbl. of water per day, and 369 M.c.f. of gas on a 14/82-in. choke. In Charenton field, three wells were treated in a zone that had never produced oil by any previous treatment. These wells responded with 48, 40, and 100 bbl. of oil per day, respectively.

Operations so far in Canada indicate a real use for this mixture. In the Morinville area in Alberta, a gas test from the basal Cretaceous yielded 5 M.M.c.f. on a drill-stem test, yet when completed made only 1 M.M.c.f. After a 500-gal. job, it produced 6 M.M.c.f. daily.

A Cretaceous well in Woodbend field, a D-2 well previously treated with 500 and 1,000 gal. of regular acid without results, came in flowing after 1,000 gal. of this mixture.

The south end of Leduc field has not responded to regular initial acidizing but a 500-gal. treatment, followed then by regular acidization, has resulted in very good production.

A Cretaceous well in Central Alberta (Pollockville) refused to flow upon completion except by heading up with no sustained production. After a 500-gal. application, it blew clean and flowed steadily.

Another sand well in southern Alberta produced only 20 bbl. of water per day. After suitable treatment, a pumping well of 50 bbl. of oil per day was obtained.

The following new wells in Southwest Texas clearly show what can be done along the line of production improvement; no oil production was obtainable before treatment with the chemical mixture.

Field, Formation	Depth, ft.	—Production, Bbl.— Before	After	
Saxet, Willis	6,760-90	0	90	10 days later
Harvey,	8,000-02	0	165	1 week later
Yoard, Slick	7,486-91	0	70	1 month later
Meatz, Frio	3,263-67	0	80	1 month later
Pierce, Frio B?	5,308-14	0	120	1 week later
Driscol, Griffith	5,236-60	0	25	6 weeks later

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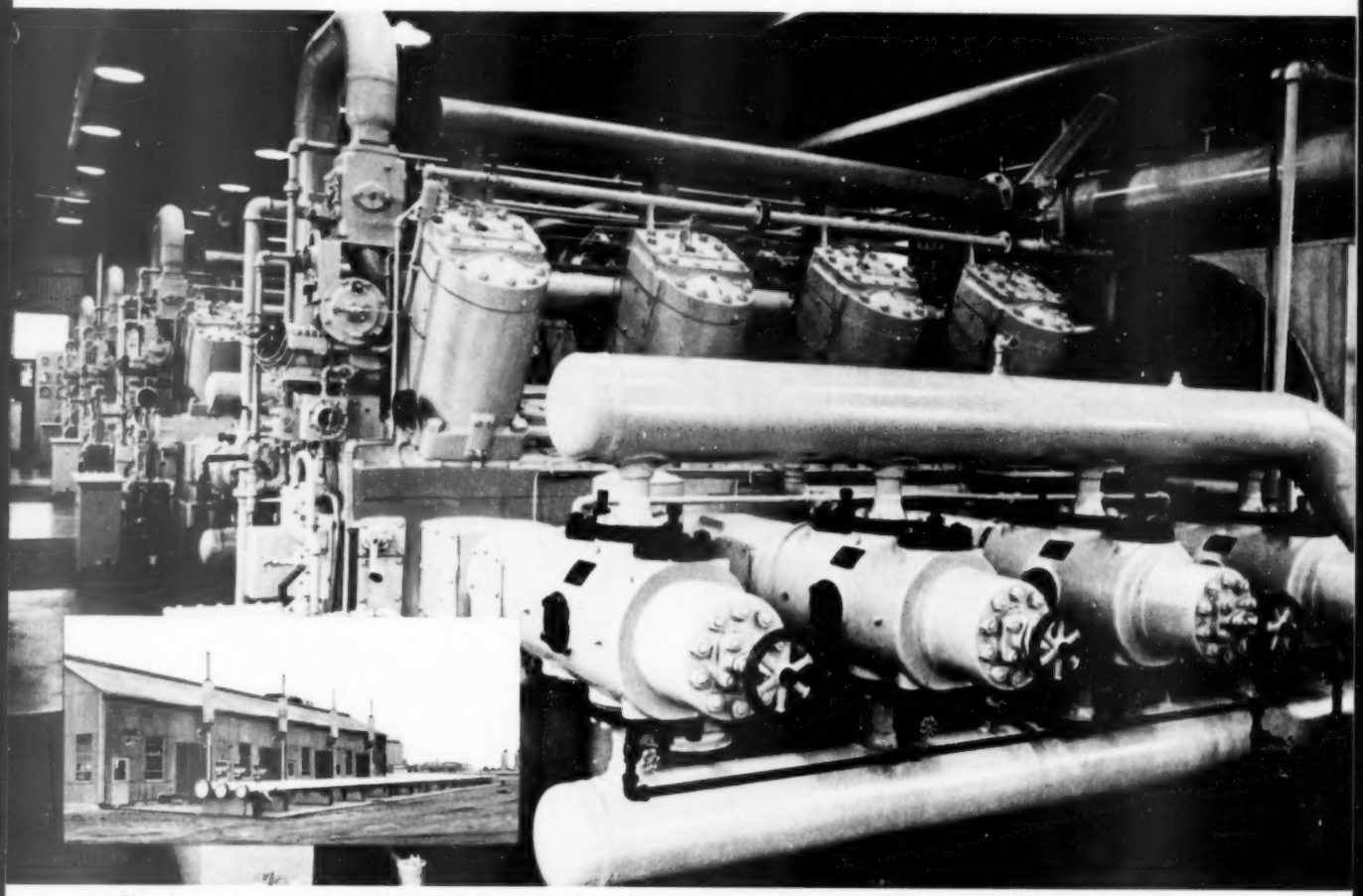

These four packaged compressor plants are equipped with Ingersoll-Rand 440 horsepower 8SVG gas engine-driven compressors and Young radiators. They include all parts, connections and controls usually found in permanent compressor stations.

Marketing Low-Pressure Field Gas— HOW A NEW PIPE LINE PICKS UP PART OF ITS GAS LOAD

ONE OF UNITED GAS PIPE LINE COMPANY'S gathering systems required a field compressor station of almost 1700 horsepower to pick up low pressure gas from one of the sands in the Agua Dulce field in which pressures have declined, and bring it up to operating pressures of its transmission system. To provide this horsepower, United has installed a bank of four 440-H.P. Beaird-Ingersoll-Rand packaged compressor plants. They pick up this gas and compress it from approximately 450 p.s.i. to transmission line pressure of 700 p.s.i.

The four packaged compressors were designed, built and assembled in the Beaird plant. On location, the only installation required was grouting and bolting on a simple concrete slab and connecting up the suction and discharge lines.

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L.P. GAS SYSTEMS

A fracture treatment was attempted in a well located in Runnels County, Texas. The pressure was applied to the Gardner sand but only a portion of the fracturing fluid could be displaced into the formation. A swab test produced only a small quantity of oil. A treatment with the chemical mixture reduced the injection pressure from 2,500 to 1,000 psi., with the subsequent fracture treatment giving a 220 bbl. of oil per day flowing well. In the same area, it is a common practice to pump 200 gal. of the chemical mixture ahead of the fracturing liquids. In other cases it is desirable to treat with 500 gal. and recover the mud and chemical mixture before fracturing. Both methods are giving good results, but usage depends upon the peculiar conditions existing in the various fields.

Water-Flood Applications

Water-injection and disposal wells have benefited from treatments with this solution in that injection rates have been increased and injection pressures lowered. There have been times when it was better not to recover the injected chemicals, while other treatments were reversed from the well; the nature of the plugging material undoubtedly controls the procedure in these cases.

Over 300 successful applications have been reported where trouble was being encountered with squeeze cementing.

Another novel use of the material is its application ahead of cement on squeeze jobs. A well near Washington, Okla., producing from 9,000 ft. started to make water. Seven squeeze jobs were attempted with 250 sacks of cement being used on each job. A pressure of 6,000 psi. was obtained on each squeeze but water flowed after the cement was drilled out. The eighth squeeze job had 500 gal. of the chemical mixture ahead of the cement. Pressure dropped when it started to enter the formation, but only 80 sacks of cement were squeezed out before the pressure reached 7,900 psi. The cement was drilled out and the formation reperforated to give a flowing well with no water.

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DRILLING POINTER

Bore-Hole Key Seats Found by Series of Caliper Surveys

by Joseph A. Kornfeld
District Editor

A NEW way to find bore-hole key seats, tried successfully in southern France recently, employs successive runs of a caliper survey. The troublesome zone is recognized by analyzing the differences in bore-hole diameter as surveyed by each of several runs with the caliper. Once this interval is determined, that portion of the bore hole is reamed and the key seat is eliminated.

Key seating defined . . . Key seating is a bore-hole condition caused by wearing a narrow groove into the well at a dog leg some distance off bottom. This condition is brought about through rotation of drill-pipe tool joints against the wall.

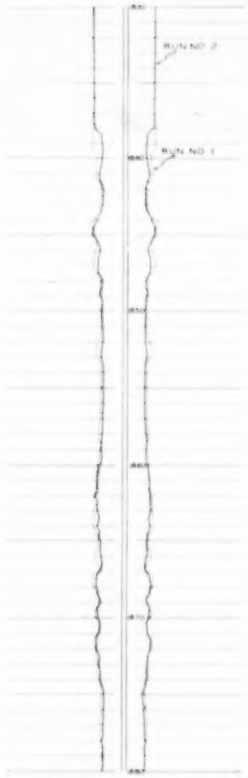
Where a key seat occurs, drill collars or subs become stuck off bottom when pulling drill pipe. Full circulation may be reestablished by jarring down the drill pipe and applying considerable torque at the same time. As the drill pipe is removed, the tendency to stick takes place higher in the bore hole.

Other drilling troubles are frequently blamed on key seats. Drill pipe sticking can be caused by obstacles in the wall.

Survey technique . . . Jean Feger, drilling superintendent of Societe Nacional des Petroleos d'Aquitaine (S.N.P.A.) reported that he has effectively surveyed key seats in several instances through the use of a three-arm caliper survey.

The method consists simply of running two or three successive surveys of the same bore hole. One caliper-survey tool comprises three arms connected mechanically in such a manner that the deflections of the arms from the center are equal. In a circular hole, the reading is independent of the position of the tool; however, in the presence of a key seat, the reading is greater if one arm of the tool intersects a groove.

Field experience shows that the tool does not follow the same path on successive runs. It is possible that the arms of the tool will describe different paths on each of several successive runs in a key-seating zone. In this manner, a different profile is recorded on the strip log if one of the arms follows in a key-seat groove one time and if none of them travels in such a groove another time.



Superimposed surveys of successive caliper-log runs found a key seat in this southern France well between 6,030-6,161 ft. (1,838-80 meters.)

By superimposing the plot of the bore-hole diameter of each of these surveys, one upon the other, the zone where key seating occurred is indicated by that interval in which the greatest increase in bore-hole diameter occurs over what would appear to be a normal profile. Once this interval is isolated, a reamer is run in the well, and that portion of the open hole showing enlargement is reamed to a larger diameter. Drill-pipe withdrawals have been made without difficulty following this surveying-and-reaming practice.

Case example . . . Fig. 1 shows two of these successive surveys, placed one upon the other. These called attention to a marked enlargement of bore hole for the interval between 6,030-6,161 ft. Hole diameter was 8½ in. The hole was then reamed out to 9⅝ in.

Acknowledgment

The writer acknowledges the assistance of Arthur Lubinski, Stanolind Oil & Gas Co., Tulsa, in the preparation of this paper.

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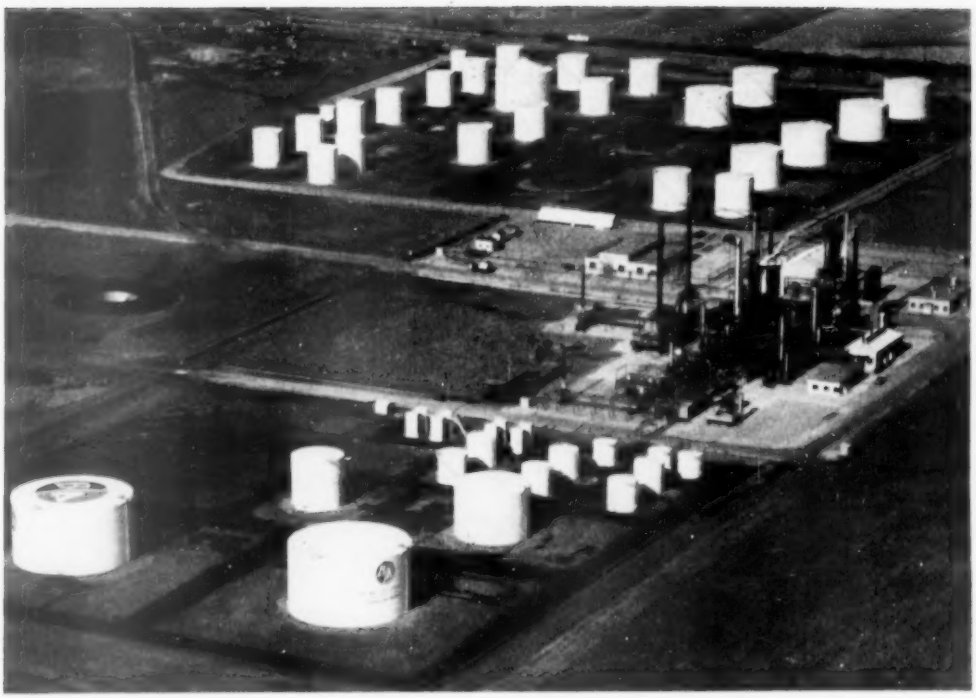


COMBINATION PLANT of British American in Edmonton is well integrated, with minimum of intermediate storage required. The 5,200-bbl. refinery makes unusually high yields of white products.

GOOD INTEGRATION

Delayed Coking Gives Needed Flexibility

. . . in British American's new Edmonton plant

by W. J. Godsman*

THE 5,200-bbl. per day combination plant of British American Oil Co., Ltd., at Edmonton, Alta., is well integrated. Certain process steps share common pieces of equipment. In many cases, oil streams flow hot from one step to the next without passing through coolers or intermediate storage. At several points there is heat exchange between streams in different process stages.

Substantial savings have been effected by these operations, both in initial investment and in operating costs.

The $7,800,000 plant, constructed by Canadian Kellogg Co., Ltd., has been in operation since June 1951.

The main source of crude is Redwater, a 34° A.P.I. crude of the following analysis:

	ASTM distillation
I.b.p.	118
10 per cent	227
30 per cent	395
50 per cent	578

Average salt content was about 35 lb. per 1,000 bbl. Sulfur is in the order of 0.5 per cent. Crude is brought in by pipe line from nearby fields.

At the time of design it was noted that very little or no demand existed for No. 2 fuel oil or bunker in these western provinces where cheap natural gas and coal exist in quantity.

The refinery therefore had to be a white-products refinery where bunker could be held to a minimum. Sufficient flexibility was also required in case a future bunker market should develop. To be able to reduce heavy fuel oil to a minimum and produce the required white product from as little crude as possible, it was decided to employ delayed coking.

Another consideration for the delayed coker was the fact that a ready market existed for this coke in the reduction of aluminum and in other metallurgical industries in Canada.

A very high percentage of demand on white products consisted of gasoline of both high and low-octane levels. To meet high octanes a catalytic cracking unit was found necessary and due to fairly large demand of medium-octane gasoline, part of the cracking could be done thermally. Demand for specialty products, including lighting naphtha, solvent, kerosine, and tractor fuel, totaled less than 5 per cent of total white but because stringent quality requirements existed it was necessary to build into the plant many facilities to cover these requirements.

A relatively high demand existed for diesel (about 13 per cent of total white) which had to meet difficult specifications for winter grades (—25° F. maximum pour point). This was overcome partly through the fact that Redwater crude has an inherently low pour point, and partly through taking a very light cut.

Process Sequence

The sequence found best adapted to requirements was a 5,200-bbl. per day completely integrated plant, including desalting, topping, delayed coking, ther-

*Chief engineer, British American Oil Co.

mal cracking, catalytic cracking, and attendant combination recovery and stabilization facilities (see process flow diagram).

It will be noted that after the desalting and topping steps three main strategic lines of flow exist:

1. Light oils to thermal unit.
2. Heavy oils to catalytic cracking.
3. Residual crude to coker.

Before arriving at these stages the crude is preheated to 200° F. by a steam heater and reflux exchange before being desalted in a Petreco electrical desalter. This operation brings the salt content down to an average 4-5 lb. per 1,000 bbl. After this step, the crude is further heated by exchange and tube still, and from topping operation the following products are withdrawn:

1. Light virgin naphtha.
2. Solvent.
3. Kerosine.
4. Diesel.
5. Heavy gas oil.
6. Reduced crude.

The straightrun naphtha is caustic washed and treated before blending. Solvent is caustic washed and sent to storage. Kerosine cut goes to (1) storage as such after caustic wash, (2) is blended with diesel cut to produce specification diesel, (3) excess kerosine is thermally cracked. Diesel cut goes to storage as such after a caustic wash. Excess diesel is thermally cracked.

Both for excess kerosine and diesel an alternate sequence may be used. They may be switched in as part of feed to the cat cracker direct if desired. Heavy virgin gas oil goes to the cat cracker.

Gas-Oil Cracking and Delayed Coking

Reduced crude enters the combination crude and coker furnace and thence to one of the two coke drums where a switch valve directs it to whichever drum is being used at the time. After filling one drum with coke, the oil is switched to the other drum and the coke is removed by means of the Hughes decoking system, which cuts out the coke mechanically.

Effluent vapors from the top of the coke drum go to the flash section of the combination tower and here join thermal cracker effluent.

Tar resulting from both thermal and coking operations can be recycled to coker or is sent to product storage as bunker fuel.

Initially, operation called for sending heavy coker gas oil to the cat cracker, but at the present time this is recycled to extinction in the coker, thus limiting the cat cracker feed to virgin stocks. The reason for this change lies in an improved gasoline and coke yield obtainable from the cat cracker when excluding heavy coker gas oil. It is, however, open to doubt that gas oil from coker is responsible because some thermally cracked material from thermal cracker is contained in this so-called coker gas oil.

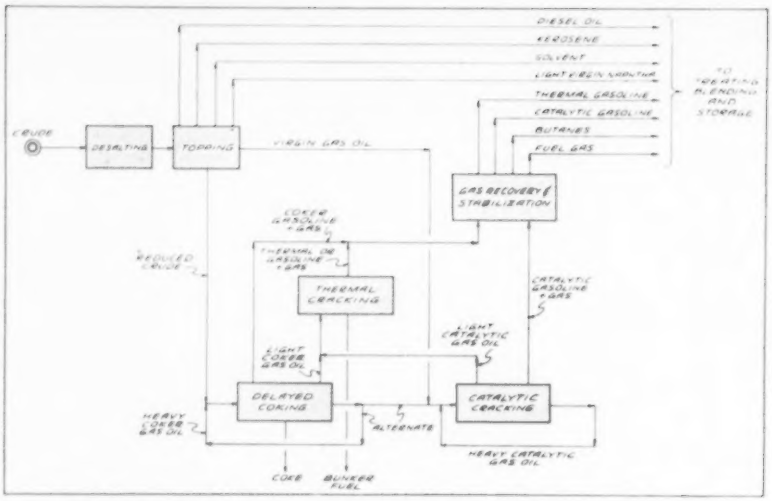
The light gas oil emerging from the combination tower represents in the main the breakdown products from the coking unit. This stream is used as lean oil for the absorber in the common recovery plant, as quench for the thermal cracker, and for reflux duties. This gas oil is eventually cracked in the thermal cracker with the rest of the feed, consisting of light cycle oil from cat cracker, excess kerosine, and diesel.

Rich oil from absorber, consisting originally of light catalytic cycle oil and light coker gas oil, is returned to the combination tower.

The overhead vapors of the combination tower consist of:

1. Coker gasoline and gas.
2. Thermal cracker gasoline and gas.
3. Absorbed gas which was stripped from rich oil.

Overhead gasoline is stabilized in the thermal gasoline stabilizer, cooled, caustic washed, and sent to storage.



SCHEMATIC FLOW DIAGRAM of British American's Edmonton refinery.

TABLE 1—OVER-ALL YIELDS

	Barrels	Per cent on crude	Per cent on all white
Motor gasoline	1,253,000	57.6	79.9
Solvents and turbofuel	26,000	1.2	1.6
Total gasoline and solvents	1,279,000	58.8	81.5
Kerosine	16,000	0.7	1.0
Tractor fuel	39,000	1.8	2.5
Diesel	235,000	10.8	15.0
Total heavy white products	290,000	13.3	18.5
Total all white products	1,569,000	72.1	100.0
Bunker	261,000	12.0	
Liquid refinery fuel	24,000	1.1	
Miscellaneous unfinished products	2,000	0.1	
Total liquid yield	1,852,000	85.1	
Gas and loss and coke	325,000	14.9	
Total crude	2,177,000	100.0	
Coke (tons)	22,734		

Catalytic Cracking

The cat cracker is of Orthoflow design, a development of M. W. Kellogg Co. The design provides for minimum erosion from catalyst flow combined with compactness and minimum first cost.

The feed consists of:

1. Heavy virgin gas oil.
2. Diesel or kerosine (optional).

The effluent is fractionated into the following components:

1. Gas.
2. Gasoline.
3. Light cycle oil.

All heavy gas oil produced is recycled to extinction.

Overhead gasoline is depropanized in separate stabilizer, wet gas going to absorber and then is pumped to a debutanizer where excess butanes are removed in adjusting the vapor pressure. It is then caustic washed and sent to storage.

Treating

Due to fairly high sulfur content characteristics of gasoline and distillates, comprehensive treating facilities are required.

Besides caustic washing most light streams, the refinery incorporates the following treating facilities:

1. For light virgin naphtha:
   (a) Salt drier.
   (b) Copper chloride contact treatment.
   (c) Clay treater.
2. For kerosine and solvents:
   (a) Clay treater.
   (b) Salt drier.
   (c) Acid wash (two stages).
   (d) Caustic wash.
3. For thermal gasoline:
   (a) Salt drier.
   (b) Linde copper sweetening.
   (c) Inhibitor addition.
4. For cat cracker gasoline:
   (a) Inhibitor addition.

Yields

The over-all yields shown in Table 1 were made during 1952.

Time efficiency on the integrated plant was about 91 per cent, giving an average throughput per stream per day of 6,600 bbl. or close to 27 per cent over the design figure of 5,200 bbl. per day.

Maximum throughputs of over 7,000 bbl. per day have easily been attained and can be sustained for lengthy periods for both Redwater and Leduc crudes.

Above yields differ in following aspects from design:

1. Production of all products are above design.

2. A local market for bunker was found.

No better picture could be shown to illustrate the immense expansion that the Canadian West is going through. To further satisfy the ever-growing demand for petroleum products there, it is felt that further expansion of facilities probably is required.

Offsite Facilities

Tankage amounts to 480,000 bbl. It was possible to save much on the capital outlay for tankage, since crude is brought in by pipe line, and since no intermediate storage is required for the highly integrated refinery operations.

Steam generation equipment provides 120,000 lb. of steam per hour. Again a substantial saving is possible here through the combination features of the plant.

The cooling-water system presents some unusual problems. The Saskatchewan River is flanked by steep banks. During the spring thaw water levels will rise as much as 25 ft. Two intake lines run into the river which is 7,800 ft. from the refinery and 250 ft. below the refinery elevation. These intake lines go into the river for a distance of 300 ft. and are anchored to the river bed with concrete. The lines lead up to the deep well pumphouse where two 125-hp. vertical pump units, each rated at 1,250 g.p.m. against a total head of 300 ft., discharge to cooling ponds in the refinery area.

BOOK

CASE STUDIES IN COMMERCIAL DEVELOPMENT. By John E. Ullmann. Published by Chemonomics, Inc., 400 Madison Avenue, New York 7. 134 pp. $5.

This collection of case studies describes methods by which a large variety of products from the chemical process industries have been developed, tested, and finally placed on the market. Concrete examples of 37 products as handled by 64 process companies are given. In many examples a description is given of the development of a product from the test to the ultimate customer.

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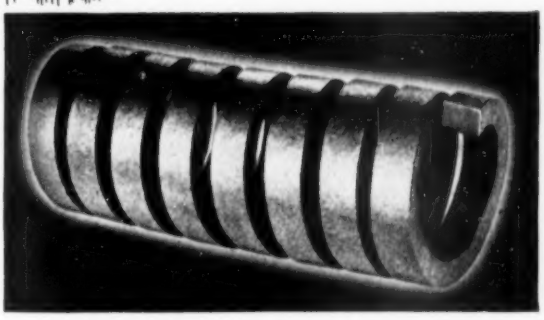

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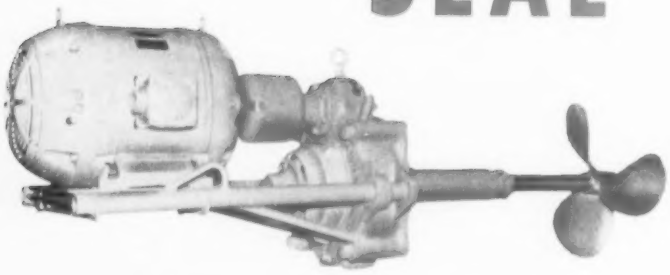

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(Continued from page 108)

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Heating is only provided in the control room by an electric heater in the discharge duct of pressurizing fans.

Communication is carried on over leased lines.

The 41 tanks of 55,000 to 176,000-bbl. capacity at the Colorado City, Ranger, and Wortham tank farms have a total capacity of 3,789,800 bbl.

Electronic tank gages are provided with transmitters, and electronic receiver with high and low-level alarm.

Station construction was contracted by the following firms: H. B. Zachry Co., Graver Construction Co., Midwestern Contractors, and Station Construction Co.

Line Construction

The system extends from flat deserts of West Texas through fertile agricultural land south of Fort Worth and Dallas and finally southward across marshy ground characteristic of sections of the Gulf Coast.

Line pipe for the project is as follows:

1. 26-in. diameter pipe, ⅜-in. wall thickness, 85.73 lb. per ft., 52,000-lb. yield and 46,000-lb. yield. At the lower end of the line into Nederland, the pipe has ¼-in. wall thickness of 68.75 lb. per ft., with 52,000-lb. yield.
2. 24-in. pipe, ⅜-in. wall thickness, 79.06 lb. per ft., 52,000-lb. yield and 46,000-lb. yield per ft.
3. 20-in. pipe, ⅜-in. wall thickness, 65.71 lb. per ft., 46,000-lb. yield.

Gate valves are installed on both sides of major stream crossings. Header gates are at each side of present and future station locations. Line gates are placed at strategic locations approxi-

mately half way between present and future station locations.

Rivers . . . At all of the five river crossings at the Colorado, Brazos, Trinity, and Sabine rivers the same wall thickness of pipe was used as for the rest of the line. There were two crossings on the Trinity River.

The practice at rivers was to lay the line in a straight section at a depth to provide a minimum cover of 4 ft.

Sags were placed well back into the banks for anchorage in a position to facilitate emergence from the stream crossing depth at a slope of 1 ft. to each 5 ft. of rise.

River banks were restored as nearly as possible to their original condition. Sand bagging was done where needed to prevent erosion.

Right-of-way with width of 50 ft. was acquired throughout the route of the line without exercising right of eminent domain.

Ditch width for 26-in. pipe was 42 in. For the 24-in. pipe it was 40-in., for the 20-in. pipe, 32-in. Depth of ditch in all cases provided for 24-in. cover under usual conditions.

In rock sections the width of normal ditch was measured at the bottom of the trench and to a depth to provide for a minimum of 12-in. of cover. In rocky ground, there was 4-in. of earth padding under the pipe.

Rock excavation was paid for on a per yard basis. The procedure for estimating rock excavation was a departure from the common practice of measuring rock sections immediately following the trenching machine. This method required that the contractor use rock plows or rock rippers, and ditching machines followed up by back hoes and other mechanical equipment before the rock was classified for payment.

The rockiest section of the project was contracted by Associated Pipe Line Contractors, Inc., between the Granbury area and the Colorado City station where 120 miles of 26-in. was laid.

Welding inspection . . . X-ray radiographic inspection was applied throughout construction of the system. All welds at road casings and stream crossings were X-rayed. Approximately 10 per cent of the welds were X-rayed on the remainder of the line.

The entire line was coated with coal-tar enamel with minimum thickness of 3/32-in., wrapped with glass mat imbedded in the coating and an outside wrap of 15-lb. coal tar saturated of asbestos felt.

At road casings and stream crossings a second flood coat was applied between the glass mat and the felt.

Pipe laying was contracted by Anderson Brothers Corp., Panama-Williams Co., Associated Pipe Line Contractors, and Fulton & Brodie, Inc.

BOOKS

RADIOISOTOPES IN INDUSTRY. Edited by John Bradford. Published by Reinhold Publishing Corp., 330 West Forty-second Street, New York. 309 pp. $8.

Based on a series of lectures presented at Case Institute of Technology, this book covers all of the important uses of radioactive isotopes. The original material was amended to include the most recent developments and now represents a succinct compilation of the most up-to-date available information on this field. Liberally illustrated, the book also treats the important related topics such as laboratory construction, shielding, personnel protection, handling techniques, and radioactive waste disposal. The book is written with a minimum of mathematical treatment, and can be used by those without extensive chemical or engineering training.

JACKSON COUNTY OILMANAC. Compiled and edited by Frank J. Gardner. Published by Petroleum News Corp., Box 331, Houston. 196 pp. $15.

This is the fourth Oilmanac published and the first to be devoted to a South Texas county. It includes every available map, statistics, and chart on Jackson County. Summary information on more than 50 oil pools and fields is included. Charts covering oil production, wells drilled, and stratigraphy are part of the discussion of the general geology of Jackson County. Illustrations accompanying the individual field and development summaries include sketch maps, structure maps, type and complete logs, and cross-sections. All data in this reference book is as of January 1953.

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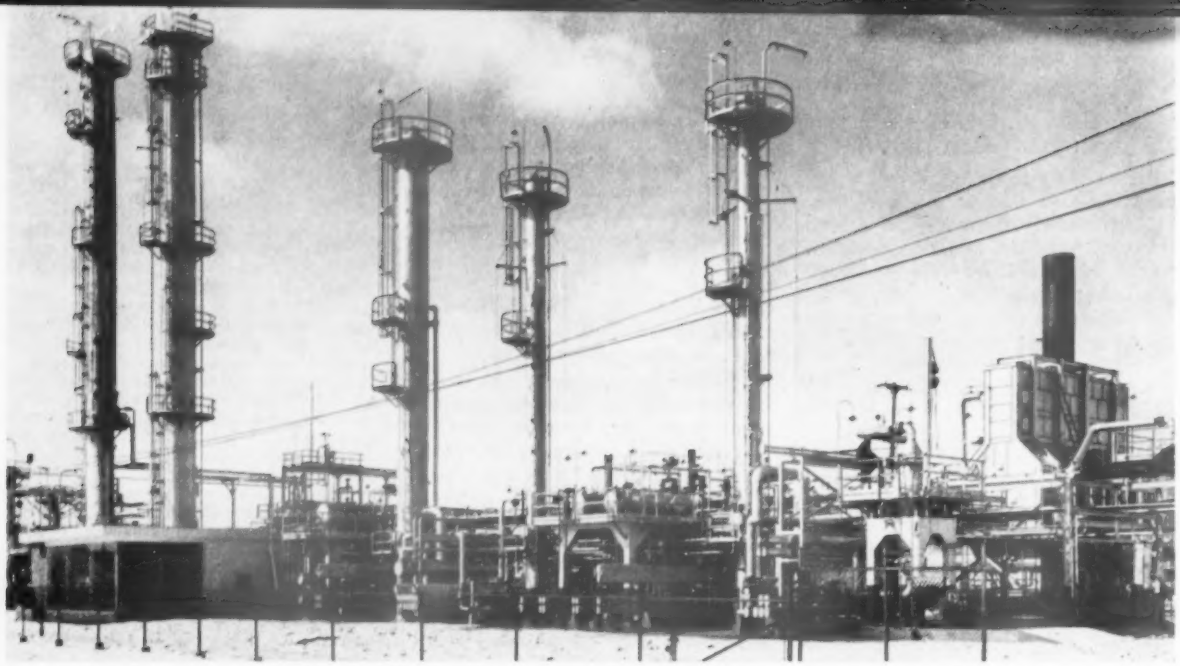


Platformer, Udex extraction unit, and Platreater at Roosevelt refinery. All the units went on stream in January 1953.

PETROCHEM REPORT:

Platreater Boosts Recovery of Aromatics

First unit of its kind now on stream at Roosevelt's plant at Mount Pleasant, Mich.

THE world's first Platreater, together with Platforming and Udex units, are in operation at the Roosevelt Oil & Refining Corp. plant at Mount Pleasant, Mich. These new facilities enable Roosevelt to employ excess hydrogen from the Platformer for hydrogenation of high-olefin-content aromatic distillates before charging to the Udex unit for aromatics recovery. Additional production of pure benzene and toluene from these byproduct aromatic distillates, supplementary to that obtained from the Platformer, is thus made possible.

Roosevelt's new three-unit combination places this refinery in the position of being able to produce a larger quantity of premium-quality gasoline, manufacture aromatics which meet the rigid nitration-grade specifications with ease, and to broaden its market for specialty naphthas and solvents, which for years have been an important part of its business.

With increasing demand from the solvent industry for aromatic-free naphthas, Roosevelt plans to supply the nonaromatic residue from the Udex plant to the trade as a specialty product, thus adding to its present line of special solvents.

Blocked operations . . . The Platformer runs for half the month on motor-fuel production at a design capacity of 1,800 bbl. per stream day. The other half of the month is used for aromatics production, for which the Platformer is scheduled to charge 1,200 bbl. per stream day of feed stock, turning out in excess of 400 bbl. per stream day of aromatics. In addition, the Platreater's daily output is 250 bbl. of aromatics.

Treating Aromatic Distillate

Michigan crudes processed by Roosevelt contain a low percentage of naphthenes. The total amount of benzene and toluene which the Platformer alone with the Udex plant could have produced from these crudes was estimated at 180 bbl. per calendar day. Of this amount, 140 bbl. per calendar day would have been toluene.

The refinery buys aromatic distillates from chemical companies. These are concentrates which it had been unable to process previously for recovery of pure benzene and toluene but which it used as a motor-gasoline component.

High olefin content . . . The aromatic distillates—a byproduct of ethylene production by high-severity thermal cracking—contain recoverable benzene and toluene estimated at about 250 bbl. per calendar day. But they also contain a wide variety of unsaturates, chiefly olefins which make up 38 per cent of the concentrates.

Hydrogenation of the olefins and destruction of sulfur compounds facilitates operation of the Udex unit for high-quality aromatic products. The product issuing from the Platreater has been found to be a good feed for recovery of aromatics, and gives the refinery a supplemental supply of benzene and toluene to those obtained from the Platformer.

Excess hydrogen from the Platformer, produced either in the motor fuel or aromatic runs, is cycled through the Platreater to saturate the olefins into paraffins before charging to the Udex unit. The constant supply of hydrogen enables the Platreater to be run continuously.

Processing

The distillates used in the Platreater are delivered to Roosevelt by truck, then pumped from storage to a prefractionator. Here a sidecut which constitutes the Platreater charge is made. The sidecut is mixed directly with a gas

stream and then preheated through heat exchangers, from which the combined feed enters a catalytic reactor where contact is made with the Platreater catalyst.

After passing through the reactor, the product is sent to a cooler, then to a separator. The liquid from the separator is charged to a stabilizer column, where the stock is stabilized to C_6 and heavier bottoms. The bottoms are sent to the Udex charge tanks, which also contain the product of the Platformer's benzene-toluene operation. These two products combine to create feed stock for the Udex unit.

TABLE I—ROOSEVELT OIL & REFINING CORP. UDEX UNIT FEED AND PRODUCTS

	Feed	Raffinate	Benzene product	Toluene product
Benzene, weight per cent	15.3	0.0		
Toluene, weight per cent	22.6	0.7		
Boiling range, A.S.T.M. D-835-47, °C.			0.9	1.0
Acid wash color			+1	0
Freezing point, °C.			+5.3	
Gravity, °A.P.I.	58.0	76.7		
A.S.T.M. distillation, F.:				
I.b.p.	146	144		
5 per cent	163	150		
10 per cent	164	152		
30 per cent	170	158		
50 per cent	179	164		
70 per cent	193	174		
90 per cent	222	194		
95 per cent	237	206		
E.p.	272	274		
Per cent recovered	98.5	99.0		
Per cent bottom	1.0	0.5		
Per cent loss	0.5	0.5		

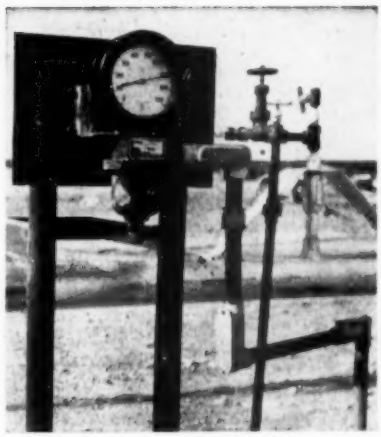
Udex solvent extraction . . . Feed stock from the Udex charge tanks is pumped into an extractor, where it is contacted with diethylene glycol, solvent for removal of aromatics from the feed stock. Nonaromatic raffinate from the Udex plant passes out of the extractor through a water wash to storage.

(Continued on page 127)

READING FOR PROFIT — JOURNAL CHECK CHART

What Is This Equipment?

THIS instrumentation setup is found in a compressor station on a gas line out in the Permian basin of West Texas. However, it could be adapted for a number of field or plant processing applications.



Can you identify it? Check the answer in one of the squares below, then turn to page 127 to check yourself.

- ☐ Remote temperature indicator installed on the high-pressure discharge from the compressors.
- ☐ Drip point for the removal of condensate caused by increase in pressure.
- ☐ Pressure transmitter on discharge gas from the compressors.
- ☐ Remote manual shutdown device for cutting off electrical power to the plant in case of fire.

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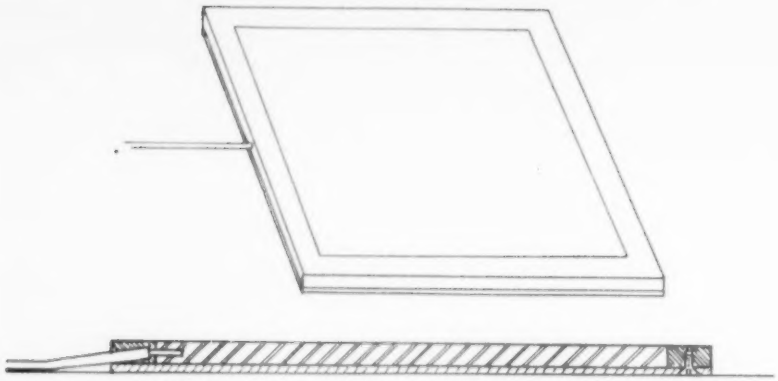


TEST COUPON ASSEMBLY . . . Back and edges are protected by bakelite, the steel coupon being imbedded in the frame with mastic. The lead wire is soldered into a drilled hole in the edge, and brought out through a slot cut in the frame. The entire assembly is mounted against the tank wall where the current density is to be measured. Fig. 1.

Value of Test Coupons In Cathodic Protection

Two questions can be answered. . . Is full protection being afforded at a certain point on a structure?

Second, what is current density at a given location?

by Marshall E. Parker*

THE use of test coupons in the comparison of alloys or the evaluation of treatment programs is well known in the process industries. In this application, weighed samples of the metals being tested are exposed to the corrosive fluids for definite periods of time, and the weight losses determined by careful reweighing.

As applied to cathodic protection, however, the coupon technique is a little different; rarely is weight loss considered, the usual question being merely the attainment of cathodic protection or the failure to attain it. The test coupon may be used to give the answer to two different questions: first, to tell whether full protection is being afforded at a certain point on a structure; secondly, to measure the current density at a given location, usually one which is normally difficult of access. The first application was much more in vogue formerly than is now the case; it is still valuable, however, as a definite demonstration of the efficacy of cathodic protection, useful in convincing the skeptical. Two similar coupons, of 10 or 12 sq. in., are prepared; it is best to cut them from the same piece of metal, and this should duplicate as nearly as possible the metal of the structure under investigation, which is usually a pipe line.

*Corrosion consultant, Houston

Connecting the Coupon

At the selected point, the pipe is excavated, and one of the coupons is connected to it by means of a short piece of insulated wire. It is important that **all** exposed copper and solder be covered up, to prevent the introduction of dissimilar metals into the problem. The connected coupon and the free one are then placed, side by side but not touching, against the unexcavated earth at the side or bottom of the hole—at about average pipe depth—and firmly backfilled. The backfill should be tamped, and, if very dry, should be wet down. Installed in this manner, several months must elapse before there will be a significant difference in the attack on the coupons, except in very corrosive soil.

An accelerated test may be had by wrapping both coupons in a rag saturated with salt water. Care should be taken to avoid contact between the coupons, and they should be placed similarly with respect to the pipe itself. After as little as 24 hours, an inspection will show the unconnected coupon to be covered with rusty spots (although the actual metal loss will be negligible) while the connected coupon is bright and clean; that is, if the cathodic protection at the point chosen on the pipe line is really adequate.

This test is very dramatic—when it works. It should not be taken too seriously, because there are several things which can go wrong. The severe corrosive condition imposed by the salt may actually require a higher current density to inhibit corrosion than the pipe line itself needs; hence an apparent failure may occur when the protection is actually adequate. There is also some question as to whether the attack on the unconnected piece may be accelerated by its being in the current field of the protective system—in other words, it may actually be subject to stray current corrosion.

Measuring Current Density

The other application mentioned, that of measuring current density, is less spectacular but more useful. It is particularly useful in the study of buried tanks, or of the bottoms of tanks resting on soil. The principle here is to expose a known area of metal as near as possible to the surface of the structure, but insulated from it. A lead wire is brought out from the coupon, and the current flow from this lead wire to the tank can then be measured.

If properly done, this will indicate the current density flowing to the tank in the same general location (if the tank is coated, the bare coupon will indicate the current density per unit area of equivalent bare tank metal—which is what we are really interested in.) The figure illustrates one method of assembling such a test coupon, designed to be permanently buried with a tank. The coupon is made 8½ in. square, which is almost exactly one-half a square foot. The back and all edges are protected from current flow by being imbedded in a cold-applied mastic. The bakelite frame completes the insulation. The lead wire is soldered into a hole drilled in the edge of the plate, so that all solder and copper are shielded from contact with the soil.

Coupons such as this may be placed below and alongside completely buried tanks, at a sufficient number of points to indicate current distribution; three or four will usually suffice. The lead wire should be No. 10 or even No. 8, to minimize errors due to its resistance. If the current is measured with a low-resistance ammeter, the error will not

usually be large. For greater accuracy, however, it is well to take readings on two scales, and correct by the equation

$$I = \frac{I_L I_H (R - 1)}{R I_L - I_H}$$

where

I = corrected reading
I_L = reading on low scale
I_H = reading on high scale
R = ratio between the two scales

Another method of making this correction is to read the open-circuit potential with a potentiometer, and also read the potential across the ammeter. These two pairs of E's and I's may then be plotted, and the line extended to $E = 0$ for the corrected reading of I. Neither method corrects for the lead wire resistance, but they do eliminate the error caused by the resistance of the ammeter. If the length and size of the lead wire are known, its correction may be computed, but this will seldom exceed a few hundredths of a milliampere and is less than the experimental error—unless very small wire or very long leads have been used. Lead-wire error can only be corrected by calculation, or by using two leads to each coupon, one for the current and the other for a potential reading; the use of large wire is a much more practical approach to the problem.

Platreater Boosts Recovery of Aromatics

(Continued from page 125)

Solvent containing extracted aromatics passes into a solvent stripping column, where aromatics are recovered. In subsequent operations, the aromatics pass through a water wash and a clay treater before going into intermediate tankage.

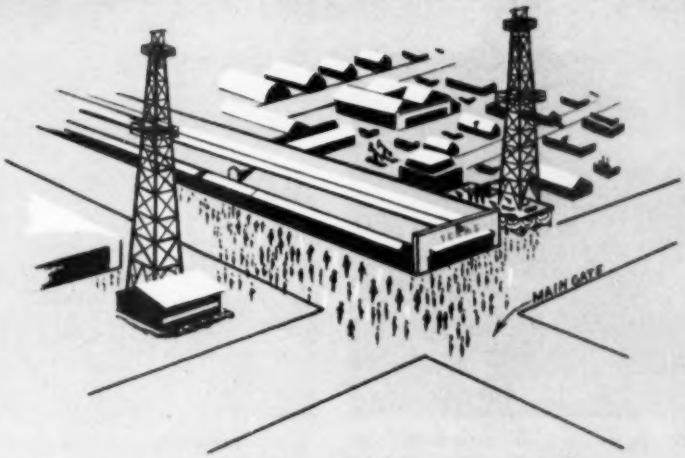
Platformer feed stock for the benzene-toluene operation has a boiling range of about 150° to 225° F. For the motor-fuel operation, materials of a boiling range of 225° to 400° F. are used.

Roosevelt is processing 7,000 bbl. of Michigan crude a day. In the motor-fuel operations, a stabilized platformate having a leaded F-1 octane number of 92 to 94 is being produced.

All three new units at the Roosevelt refinery were engineered and licensed by Universal Oil Products Co., Des Plaines, Ill. Procon, Inc., handled construction of the units.

Answer to Check Chart

The puzzle picture appearing on page 125 of this issue is correctly identified as pressure transmitter on discharge gas from the compressors. The installation is a turbine booster station.



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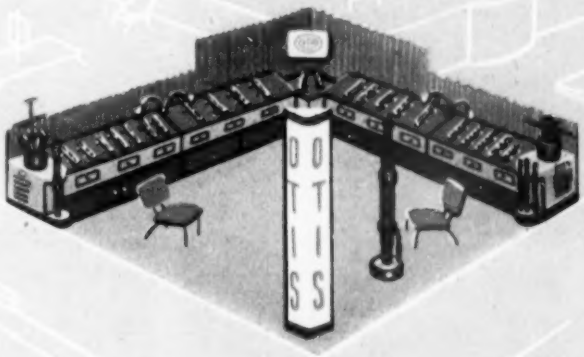

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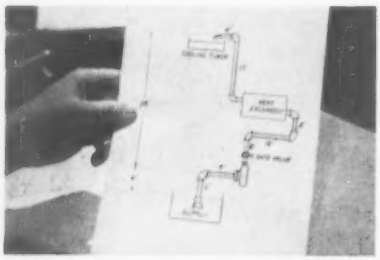
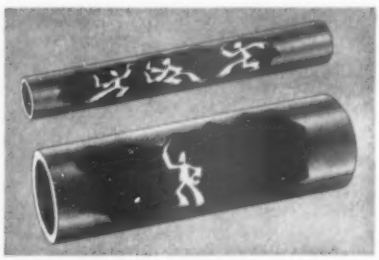
1 Picking the right size pump is like picking a hat. You first settle on right size, then decide on style. Best buy is a big factor, too.



2 The pump Johnny, a young engineer, is figuring here is for the system sketched. Each system exhibits its own special pump requirements.



3 Friction losses in pipe pile up fast, as the square of the fluid velocity, so this factor should be weighed carefully when selecting pump.

Follow the formula in selecting a pump . . . and avoid headaches later!

THE first step to follow in selecting a pump is to make a diagram of the pumping system, complete with accurate dimensions. Supply source should be shown in its true relation to the location of the proposed pump.

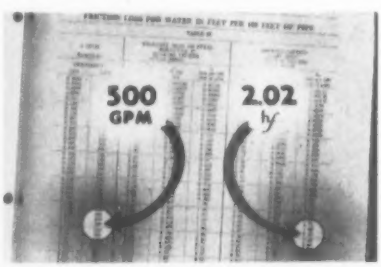
All valves, fittings, and process equipment should be shown. Pipe sizes at various places in the system should be indicated. It may be necessary to alter these sizes after friction losses have been determined. It is almost impossible to make accurate calculations without a good sketch.

Next step is to calculate total required discharge head. The various calculations are illustrated here. It is important to correct for temperature and pressure of pumped liquid, since all charts are based on the handling of cold water. Viscosity and pH are other important factors to be considered in pump selection.

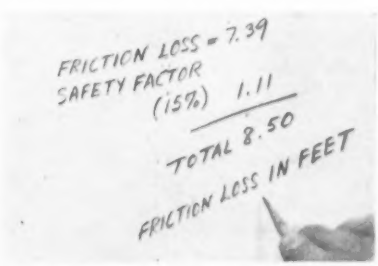
Finally, select best type for job at hand, remembering such factors as possible plant expansion, and requirements for parallel operation of pumps.

These panels, from a "movie" entitled "Covering All Angles," are courtesy of Allis-Chalmers, Milwaukee.

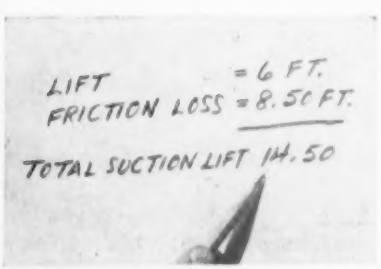
4 You've got to figure straight-pipe loss also. You add it to the fitting loss to get your total loss, like Johnny is doing above.



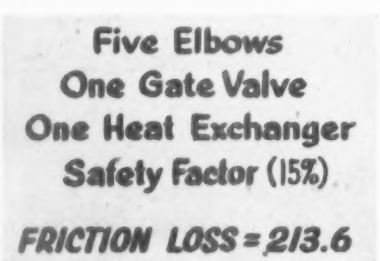
5 The Standards table shows friction loss. For instance, loss in 6-in. pipe is 2.02 ft. per 100 ft. for 500 g.p.m. Other sizes vary, of course.



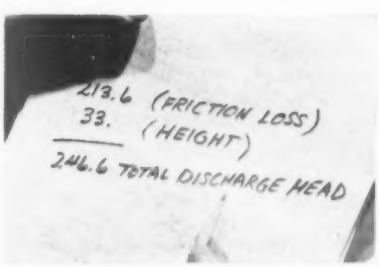
6 To the friction loss you must then add a safety factor of 15 per cent. Total loss is 8.5 ft. This rule applies for all type pumps.



7 Then to the suction friction must be added the pump-suction lift, which in the case illustrated in the calculations above, is 6 ft.

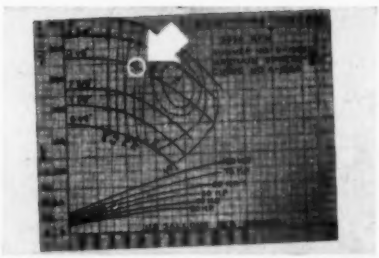


8 The discharge-side friction loss for the fittings in this particular instance is 213.6 ft., as shown in the above sample illustration.



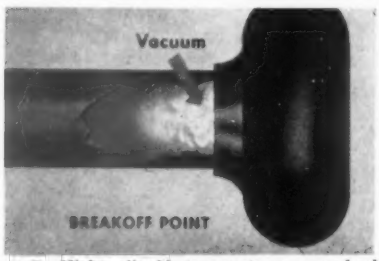
9 You must then add total friction loss to the net height of 33 ft. for discharge head, as Johnny has done here in this instance.

10 Total head on the pump is the sum of the discharge head and the suction lift. Total head here in this instance, Johnny finds, is 261.1 ft.



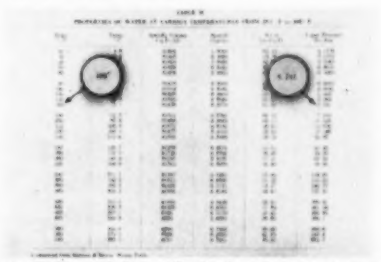
11 You've got to remember (Johnny didn't forget!) that all charts are based on the handling of cold water. This is important.

12 Important factors which you must consider are the liquid temperature and the vapor pressure. Always keep the three points above in mind.

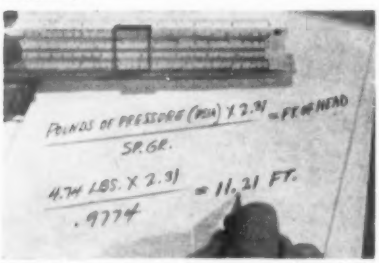


13 Higher liquid temperatures may lead to flashing, result in loss of pump suction, so temperature is vital factor in selecting pump.

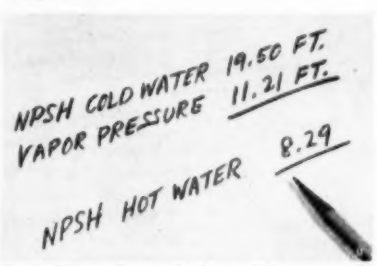
14 Next you've got to figure your net positive suction head (npsh) which will be available. Johnny used sketch above to figure his.



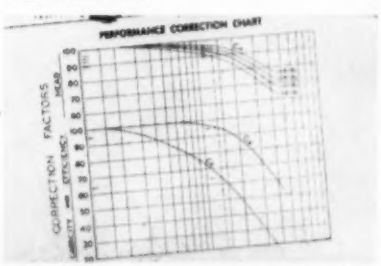
15 Next Johnny finds the vapor pressure of the liquid his pump is to handle, at the temperature it is being pumped. This comes from table.



16 What you see above is figured in pounds per square inch. This has got to be converted into feet of water as shown to obtain 11.21 ft.

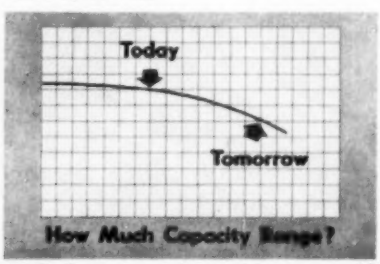


17 From the npsh. for cold water, subtract the vapor pressure, as shown here. This will give answers to questions raised by No. 12.

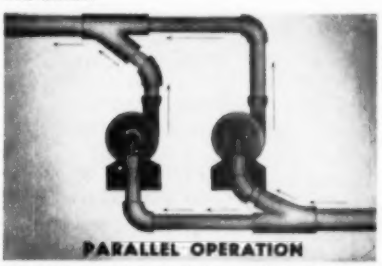


18 Next, you use your correction chart when you pump the uniform viscous liquids. They require more horsepower than nonviscous.

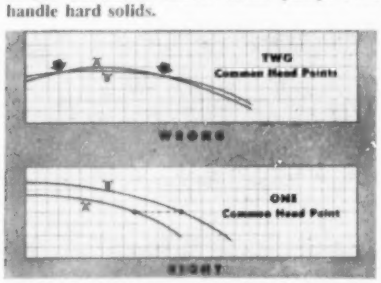
19 Acids or alkalis may be handled by the same pump. The pH scale is good in the illustration above. Some pumps even handle hard solids.



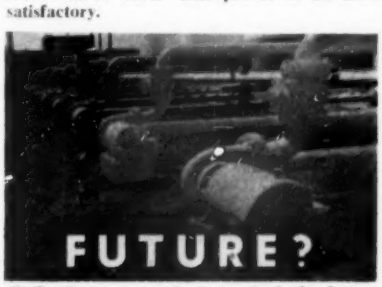
20 Be sure you always pick a pump with a flat curve if you are to regulate the flow with a valve. This proves to be most satisfactory.



21 Pumps installed in parallel must run at common head. They also must have a rising head curve, such as is shown in picture above.



22 On the above chart, if A's curve has not a constant rise, there may be two common heads. Above is wrong; below is correct curve.

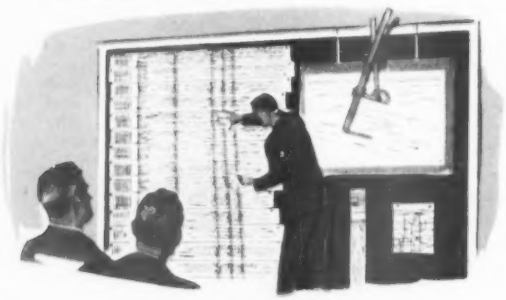


23 Be sure you don't overlook the future. You may need more head, and even more capacity. Don't under figure; still don't overdo it.

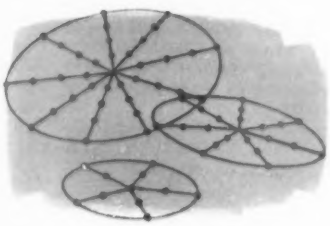
24 Be sure you remember the simple formula: "How Big? What Type? What Is the Best Buy for Me?" Do this and you can't go wrong!

SEI

EXPERIENCE



INTERPRETATION



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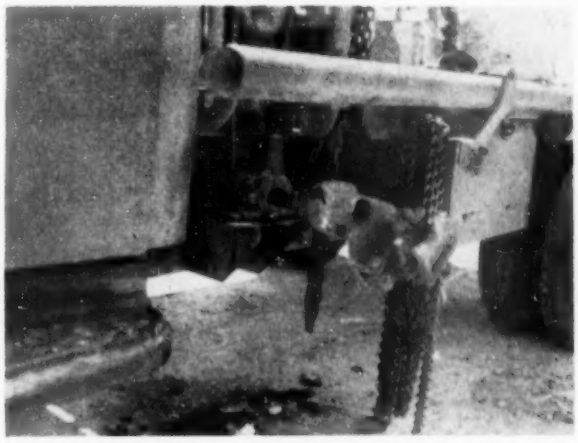


R. W. POOLE of Plymouth Oil Co., Sinton, Tex., stands beside unit he devised to thread pipe. Detail of cathead hookup is at right.

Power takeoff from truck winch used to thread pipe

A POWER takeoff from the winch on an oil-field truck is being used to simplify pipe threading on location.

A chain drive from the winch rotates a shaft to which is attached a pipe vise through the medium of a knockdown union. Pipe to be threaded is secured in the vise and then dies are secured at the extreme end of the pipe. The winch is thrown out of gear so only its shaft rotates, thus the power is transmitted so as to rotate the pipe so that with the dies held in a fixed position, the necessary threads can be cut.

Provision is made for the vise to be removed so that short lengths of pipe may be threaded by securing them in a coupling which is part of the unit.

In moving from location to location, the knockdown union is broken and the pipe-vise section carried in the tool box on the truck; otherwise it would extend beyond the body of the truck while in transit.

R. W. Poole, Plymouth Oil Co., Sinton, Tex., devised the unit.

Cathead Swings Out of Way When Rig Is Moved on Road

In the design of a trailer-mounted workover rig for C-B Drilling Co., Houston, plans called for arranging equipment to provide for fast rigging up and tearing down time. However, the cathead assembly on the driller's side of the draw works, however, was in such a position that it extended out over the trailer body which required its dismantling whenever moving the rig over highways.

To streamline this procedure, a special supporting I-beam was mounted over the draw works. One end of this is pivoted so that the beam may be swung in an arc. A trolley was constructed from a U-shaped piece of heavy steel strap which has its open end closed over by a bolt, which is allowed to roll freely along the upper side of the I-beam.

When a rig move is necessary, the bolts on the clutch plate of the cathead are removed and the cathead assembly, supported on the pivoted I-beam, is swung in towards the center of the trailer. At the same time, it may be rolled to a convenient position on the I-beam and secured while in transit.

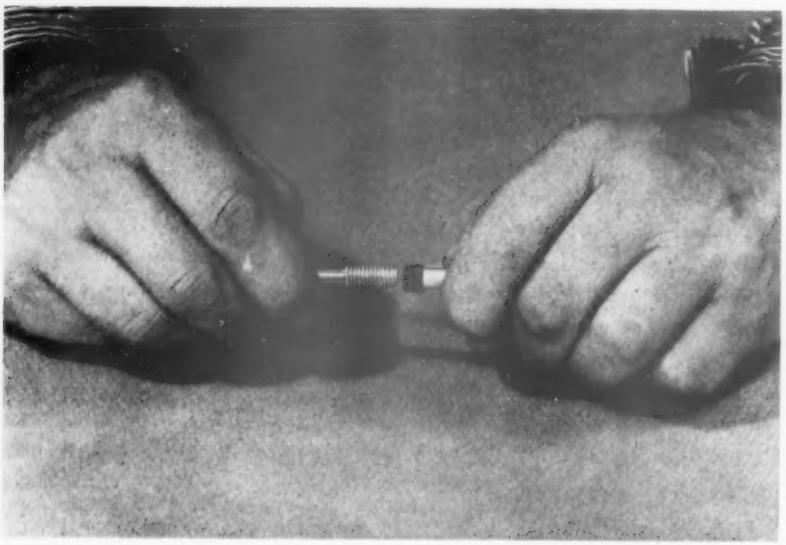
Mobile Geophone-Cable Reel Speeds Operations

Speeded-up seismic operations are possible with this motorized geophone-cable reel, developed in the research laboratories of Carter Oil Co., Tulsa. The reel, patented by Carter, since has been licensed by Standard Oil Development Co. to manufacturers.

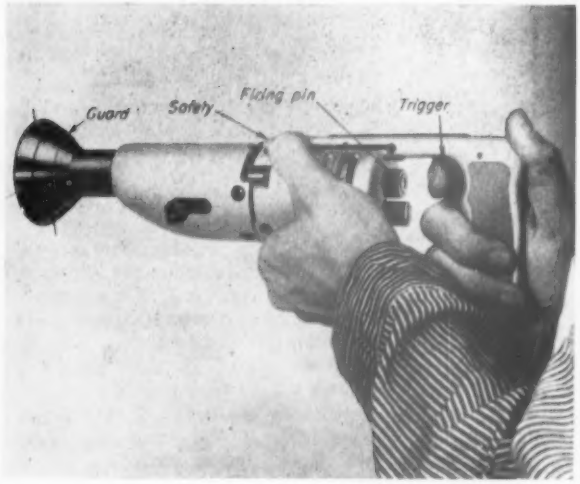
The reel, shown at the top rear of the cable truck, uses two low-pressure scooter tires. With a pressure of only 2 or 3 psi., the tire centers are softer than the edges, holding the cable firmly yet without damaging it.

The device spins out or reels in geophone cable with take-outs attached. It so speeds up cable-laying operations that in many cases more shot holes are possible with a smaller-than-normal crew. The reel is operated by an electric motor connected to the truck's batteries. While this model has no speed control on the reel, the speed of reeling can be governed by an on-off push-button, in use by the operator at left.

This model in use here is the first of six which have been put into operation by Carter crews. Earlier the laboratory had developed a hydraulically driven reel, and the company still has six of these in operation.



Operator takes cartridge . . . loads gun . . .



. . . cocks firing pin . . . shoots stud in wall

A GUN which shoots metal studs into concrete or practically any other type of hard surface saves work and a lot of time around oil installations.

For instance, if piping has to be rearranged, or new piping added, a man with one of these guns, manufactured by Remington Arms Co., Inc., can shoot the studs into the wall or ceiling of a pump station, refinery building, etc., in quick fashion, to provide a secure anchor for the piping.

The gun can also be used to shoot studs in walls for anchoring electrical boxes, instrument panels, etc.

How it works . . . In operation, the gun, or "driver," uses a gun cartridge. Position marks on the driver line up with a cross through the stud's center. To prepare the driver for studding, the operator does the following:

1. Assembles the right stud with a cartridge of proper load. These data are supplied by the manufacturer. Operator then "lines up" stud and cartridge.

2. Holding housing of stud driver with one hand, and the action-tube cover with the other, operator pushes in slide and twists housing.

3. With the stud driver in loading position, operator inserts assembled stud and cartridge into driver chamber.

4. Holding the slide all the way in, the operator at the same time closes the action by twisting housing counterclockwise. This snaps it shut.

5. Operator raises red end of firing pin, and cocks driver for firing. He then positions the guard, presses the safety, and pulls the trigger.

6. After shot is fired, operator opens the action and pulls back on ejector handle to remove shell, holding grip end down so shell will fall out easily without difficulty.

COMPRESSOR CALCULATIONS—4

Calculating Compressor Horsepower

by R. W. Brooks*

THE work necessary to compress gas is practically always expressed by the classic work equation for theoretical horsepower as:

$$T.HP. = \int V\,dP \qquad (1)$$

Where:

$$PV^n = \text{constant} \qquad (2)$$

Substituting Equation 2 and $Z_1 RT_1$ for P_1V_1, Equation 1 becomes:

$$T.HP. = \frac{Z_1 RT_1 n}{n-1}\left[(P_2/P_1)^{(n-1)/n} - 1\right] \qquad (3)$$

In the industry, generally, the exponent n is a constant which, if used in Equation 3, will give the same theoretical horsepower that would be obtained from a perfect indicator card with no compressor losses. Exponents n and k are usually taken to be the same value for isentropic paths, but Edmister and McGarry[1] point out that these values may differ due to the nonideal behavior of gases. However the value of n employed in Equation 3 (or k in Equation 4) is not too critical particularly for compression ratios below 3.0. For varying exponent values between 1.25 and 1.45 a maximum difference of 6 to 7 per cent is noted in the T.HP. requirement. If the k value as determined from Figs. 2 or 4 of installment No. 3 of this series *(The Oil and Gas Journal, May 4)* is used in place of n, Equation 3 may be expressed as:

$$T.HP. = \frac{Z_1 RT_1 k}{k-1}\left[(P_2/P_1)^{(k-1)/k} - 1\right] \qquad (4)$$

This of course is the usual equation found in most thermodynamic textbooks for the theoretical horsepower required. Theoretical horsepower calculated from Equation 4 and test data of indicated horsepower reported by Mast[2] show excellent agreement.

The first law of thermodynamics:

$$\Delta H = Q + \int V\,dP \qquad (5)$$

may be applied to establish a relationship between ΔH and $\int V\,dP$. For the adiabatic case under consideration the Q term is zero, leaving:

$$\Delta H = \int V\,dP \qquad (6)$$

The enthalpy change may be calculated in two steps, one at constant temperature and the other at constant pressure, to give:

$$\Delta H = \Delta H_T + \Delta H_P \qquad (7)$$

Using the compressibility factor and Cp data, Equation 6 may be expressed thus:

$$\Delta H = B/P_c \times [14.73 \ln (P_2/P_1) - (p_2 - p_1)] + Cp(\text{ave})(t_2 - t_1) \qquad (8)$$

where:

$$B = 4.626\,AT\,T_R$$

Cp (ave) is taken from Fig. 1 or 3 (of installment No. 3) at discharge pressure and average suction - discharge temperature, and B is calculated for the suction temperature. It is somewhat simpler to solve Equation 8 as indicated since portions of the B term will have been calculated in determining Z_1 of Equation 4.

Enthalpy changes calculated by Equation 8 and T.HP. values based on Equation 4 differ noticeably as suction pressures increase. No practicable value of k can be picked which will fully explain the discrepancy.

To overcome this difference an efficiency factor has been devised to relate properly the theoretical horsepower and enthalpy change equations. This factor is plotted in Fig. 1 and will be discussed further in the next installment.

*Pacific Gas & Electric Co. From paper presented at Pacific Coast Gas Association conference, Los Angeles, 1953.

References

1. Edmister and McGarry, Chem. Engr. Progress 45, p. 421 (1949) July.
2. Mast, Pet. Engineer, 22, D-14, 1950 (June).
3. Diserens, Worthington Research Bull. P-7637, Worthington Pump & Machinery Corp. (1949) July.

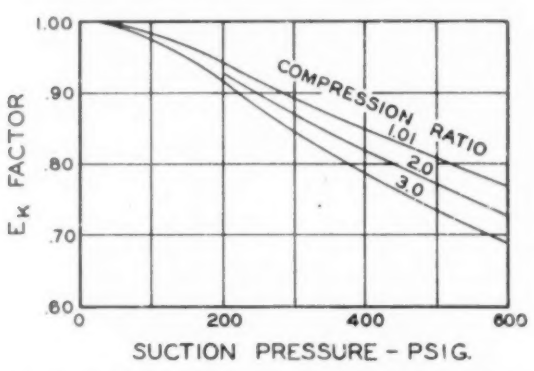


Fig. 1(A)—Isentropic efficiency, E_k, for typical natural gas at 60° F.

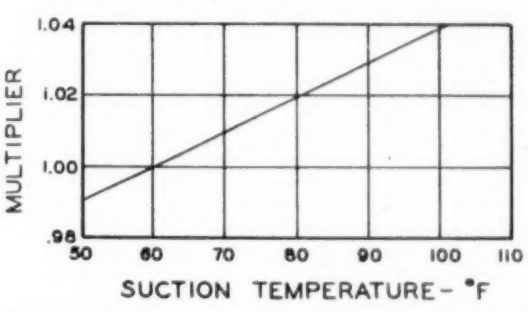
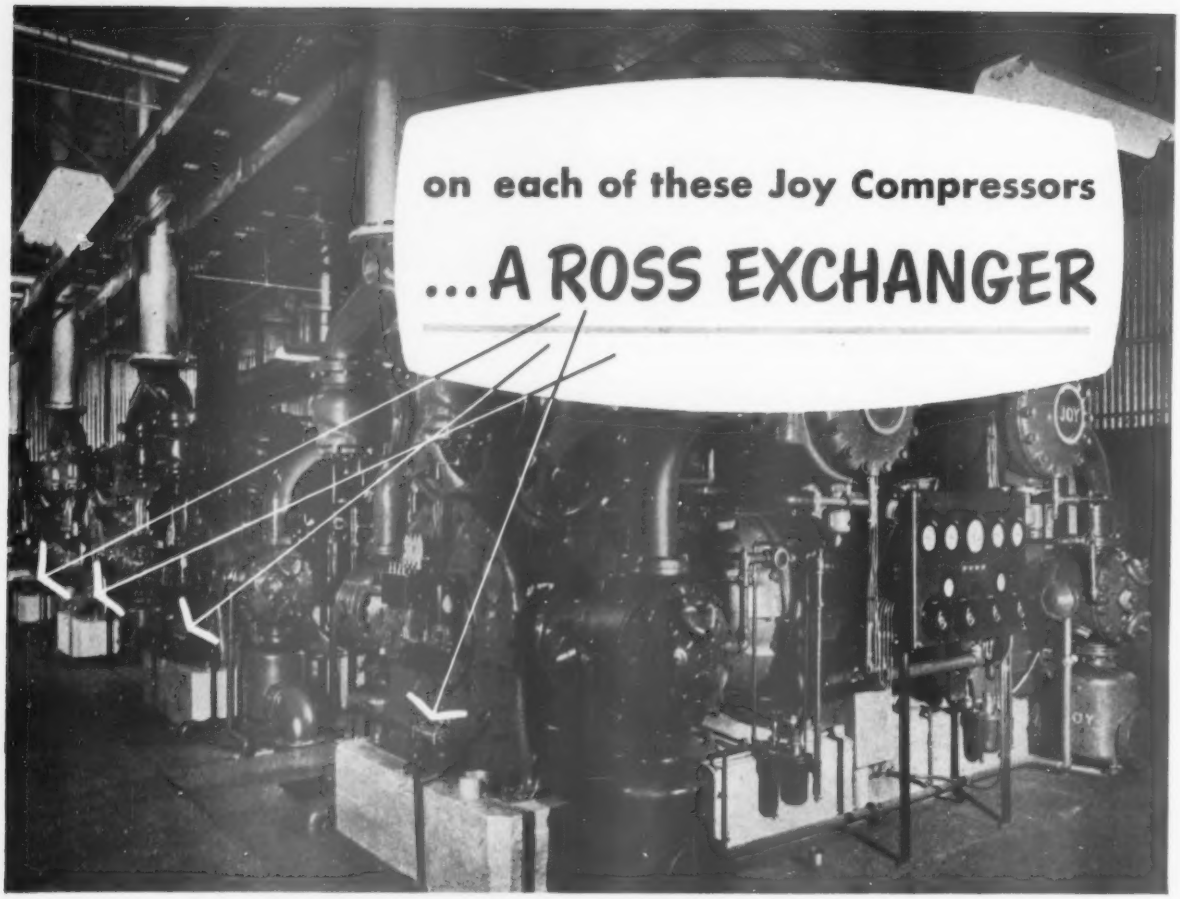


Fig. 1(B)—Multiplier for E_k for suction temperatures other than 60° F.



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Use and Care of Wire Rope—8*

. . . Proper Sizes of Drums and Sheaves

SHEAVES and drums should receive careful attention. The diameter of the sheave or drum at the bottom of the groove is important as well as the diameter of the groove itself. Tables have been prepared, giving the ratio of rope diameters to sheave diameters. Those referred to in the following table as "average" are to be preferred, and nothing less than the "minimum" should be used if economical service is to be secured.

	Avg. diam.*	Min. diam.*
For 6 by 37 classification rope	27	18
For 8 by 19 classification rope	31	21
For Styles B and G flattened strand and 6 by 19 classification rope	45	30
For 18 by 7 rope	51	34
For Style D flattened strand and 6 by 7 classification rope	72	42

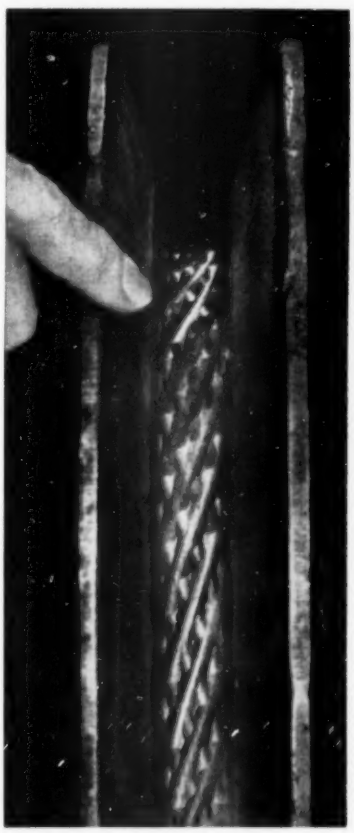
*Times rope diameter.

It should be thoroughly appreciated that diameters larger than those listed as minimum will give increased rope life, and, consequently, more economical service. Various service conditions allow, and often require for economical service, changes from these diameters. For example, on larger hoisting installations, sheaves for use with 6 by 7 rope are sometimes specified at 96 times the rope diameter and for 6 by 19, the ratio is frequently as great as 90 to 1.

It is also recognized that on many machines, on account of the limitations imposed by their design, sheaves of smaller diameter than the minimum given above must be used. This reduction in diameter may approach but should never equal what might be called a critical ratio, below which the free movement of strands and wires are so restricted that rope deterioration is very rapid.

Drum diameters should conform to these recommended ratios, except in case of shaft and incline hoists, where larger diameters than average will greatly increase the rope service.

*Taken from Bulletin 61, Use and Care of Wire Rope, A. Leschen & Sons Rope Co.



WORN AND CORRUGATED sheave groove is a good example of a very bad condition. A new rope put on a sheave like this would be seriously and dangerously handicapped.

Most ropes are used on drums or in contact with sheaves or rollers. Careful inspection should be made of the size, contour, and condition of the grooves. Gages are available for measuring the size of grooves. These are made with the allowable tolerances included and should fit perfectly in the bottom of the groove when a new rope of the corresponding diameter is applied. A tight groove will pinch and damage a rope and this is indicated by the gage not reaching to the bottom.

A rope is unnecessarily abraded, and its life shortened, if it has to cut its own seat in a tight groove or one that has been corrugated. A new rope should not be used in a groove that has become corrugated by the strands of a previous rope. The strands will not fit the old corrugations and the new rope will have to smooth these off before it will properly seat itself.

A groove intended for a large rope will not give sufficient support to a much smaller rope, and the rope flattens out and wires are fatigued. To obtain maximum service, the grooves should be of a diameter to provide a slight clearance for normal movement of wires and strands. All new ropes are slightly oversize and will pull down slightly in diameter, as the rope adjusts itself to working conditions.

Proper support means contact between rope and groove for about 150°, or, an angle between flanges of about 30°. If the fleet angle is large, a wider-throat angle may be necessary to avoid rubbing of the rope against the flanges, reducing the angle of contact to about 130°.

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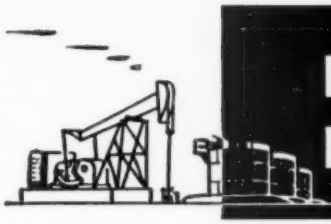

ENGINEERING FUNDAMENTALS

Use of Partial Specific Volumes

THE concepts of partial specific and partial molal volumes were presented in the last number of this series. It was pointed out that these quantities depend not only on temperature and pressure but also on composition. Because of the complex nature of natural hydrocarbon mixtures, certain correlations and simplying assumptions must be made in applying the necessarily limited data to such mixtures.

One use of partial volumes of hydrocarbons in the liquid state is the prediction of liquid volumes in the formation from composition. The use of the specific volumes of the separate constituents at the given temperature and pressure is subject to some error. For instance, adding a pound of methane (dissolved) to a barrel of one type of crude will not necessarily cause the same increase in volume as adding it to another type. It is said that when the average molecular weight is high the methane molecules have a better chance of occupying otherwise empty spaces than when the average molecular weight is low.

The available data for the pure light liquids are tabulated in terms of the average molecular weight of the remaining constituents.[1] Let us assume that it is desired to know the specific volume at 160° F. and 2,000 psia. of a crude having the composition by weight fractions given in Table 1. The partial specific volumes v for the first five constituents were taken directly from tables, for the conditions given, assuming an average molecular weight of the remaining constituents of 200.

Partial specific volumes of hexanes and heavier must in general be determined for the crude in question. For want of additional information it is assumed equal to the specific volume, this being calculated from density measurements and a correction for the conditions, based on compressibility and thermal expansion. The total of the last column gives the specific volumes of the mixture in accordance with the equation:

$$V\ (sp) = v_1x_1 + v_2x_2, \text{ etc.} \qquad (1)$$

With the exception of methane, the partial volumes are for practical purposes equal to the specific volumes of the respective constituents, at the same pressure and temperature.

In the case of hydrocarbon gases the "residual" is listed as the difference between the actual partial specific volume and the specific volume which the constituent would have at the given pressure and temperature if the ideal gas laws were obeyed. The residual is thus a sort of measure of the contribution of that constituent to the departure of the mixture from the gas laws. The residuals for methane, ethane, etc., are therefore:

$$r_1 = \frac{10.73\ T}{M_1\ P} - v_1, \text{ etc.} \qquad (2)$$

where M is molecular weight and the subscripts refer to the number of carbon atoms.

Partial volumes for methane through normal butane are available for the three binary systems with methane as one component. For convenience, let r_2, r_3, r_4 refer to the residuals for ethane, propane, butane in these systems. The notation r_{12}, r_{13}, r_{14} refers to methane in these systems. To illustrate the use of these limited data for a natural gas the following assumptions are made. The composition is taken in terms of weight fractions. The amounts of butanes and heavier are regarded as normal butane. Values or r_2, etc., are looked up on the assumption that everything but that constituent is methane. (This would not be justified if the gas were not chiefly methane.) The value r_1 for methane is taken as a weighted mean of r_{12}, etc., that is:

$$r_1 = \frac{(r_{12}x_2 + r_{13}x_3 + r_{14}x_4)}{(x_2 + x_3 + x_4)} \qquad (3)$$

TABLE 1—CALCULATIONS OF THE SPECIFIC VOLUME OF A LIQUID FROM COMPOSITION

Const.—	Wgt. fr.	v	xv
Methane	.015	.048	.00072
Ethane	.008	.046	.00037
Propane	.016	.034	.00054
Butanes	.021	.029	.00061
Pentanes	.025	.026	.00065
Hexanes and heavier	.915	.01834	.01678
		Specific volume =	.01967

Using Equations 1 and 3, and noting that $x_2 + x_3 + x_4 = 1 - x_1$, and that terms containing P, T, and M combine to give one containing M_a, the average molecular weight, the following equation is obtained for the specific volume of the gas:

$$V = \frac{10.73\ T}{M_a\ T} - [x_1/(1 - x_1)]$$

$$\times (r_{12}x_2 + r_{13}x_3 + r_{14}x_4)$$

$$- r_2x_2 - r_3x_3 - r_4x_4 \qquad (4)$$

Table 2 shows a sample gas composition. Since such compositions are usually given in terms of mol per cent or mol fractions, these must be converted to weight fractions x. The residual r given in the last column were taken from the literature for 160° F. and 2,000 psia. Substituting from Table 2 into Equation 4, the specific volume is:

$$V = \frac{10.73 \times 620}{20.81 \times 2{,}000} - (0.631/0.369)$$

$$\times (.127 \times .021 + .095 \times .016 + .147 \times .018)$$

$$- .127 \times .060 - .095 \times .045 - .147$$

$$\times .056 = 0.128 \text{ cu. ft. per lb.} \qquad (5)$$

Comparison with the first term alone shows a supercompressibility factor Z = 0.80. For engineering purposes the method of partial volumes is much more cumbersome for gases than some method relating Z to composition, such as the use of pseudoreduced pressure and temperatures.[2] It is probably less cumbersome and more accurate with a reasonable amount of data available than the use of an elaborate equation of state with the constants recalculated to conform to the composition.[3]

TABLE 2—CALCULATION OF THE SPECIFIC VOLUME OF A GAS COMPOSITION

Const.—	Mol fr.	M.W.	Wgt.	x	r
Methane	0.821	16	13.14	0.631	0.021, 0.016, 0.018
Ethane	0.088	30	2.64	0.127	0.060
Propane	0.045	44	1.98	0.095	0.045
Butanes	0.025	58	1.45		
Pentanes	0.015	72	1.08	0.147	0.056
Hexanes	0.006	86	0.52		
	1.000		20.81	1.000	

References

1. Sage and Lacey, A.P.I. Drilling and Production Practice, 1938-39.

2. J. C. Calhoun, "Pseudocritical Temperature of Gas, The Oil and Gas Journal, October 4, 1947, p. 103.

3. R. F. Nielsen, Equations of State-Gaseous Mixtures, The Oil and Gas Journal, February 9, 1953, p. 135.

*Associate professor, petroleum and natural-gas engineering, Pennsylvania State College.

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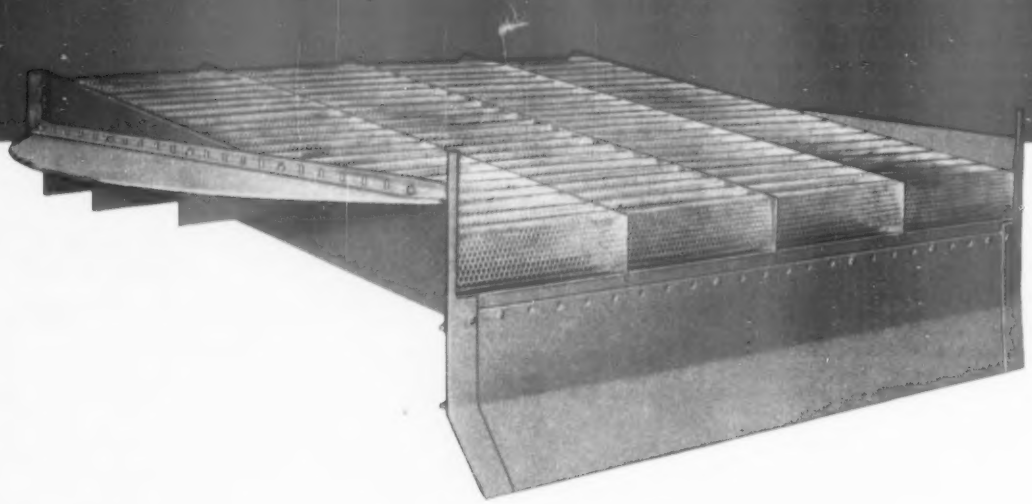

CASE HISTORY No. 1 . . .

One refiner was operating a 7.5' vacuum tower which was limiting capacity and yields due to the pressure drop of existing bubble trays. Capacity desired was:

Vapor . . . . 24,600 #/hr of 0.0137 #/cf density
Liquid . . . . . 36,400 #/hr of 58.3 #/cf density

This refiner replaced the bubble trays with "Benturi" Kaskade trays on the same supports, and is now obtaining a pressure drop of less than 1.0 mm hg pressure drop per tray.

CASE HISTORY No. 2 . . .

An engineering firm recognized a pressure drop problem with a process duty equivalent to:

Vapor . . . . . 35,500 #/hr of 0.26 #/cf density
Liquid . . . . . 965,000 #/hr of 62.4 #/cf density

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PETROLEUM PRODUCTS

How to Write Military Specifications

by Dr. W. E. Kuhn*

Some shortcomings in the preparation of military specifications were noted by Dr. Kuhn in a recent talk before the Navy Cooperative Committee. Military specifications, functions of government laboratories, and advances in product development were dealt with. Dr. Kuhn commended the Navy "for its approach to industry in seeking cooperation in its product development problems . . . especially in the area of lubricating oils . . . through the Navy Cooperative Committee and the recently established subcommittees of this group."

IT is fully recognized that military equipment, in many cases, is required to operate under severe conditions and over a very wide temperature range well in excess of normal commercial operations. For this reason, there is a need and requirement for military-defined petroleum products. In some cases, these products have been the forerunner of a commercial commodity. Because of the use of these products and the duty required of them in military operations, special properties are sometimes essential. Product cost or economy of operation which is so essential in industry can become secondary to performance in military emergencies. This requirement places a responsibility on the shoulders of military services to provide for new developments which are beyond the point of then-current commercial experience.

Performance tests . . . Industry has no quarrel with performance tests as a basis for product qualification. In fact, it is industry's practice to thoroughly evaluate a product in the equipment in which it is to be used or its prototype. The petroleum industry's laboratories have bearing machines, internal-combustion engines, hydraulic mechanisms, etc., in which to make such evaluations. The performance requirements in service installations are thus accurately defined and with this knowledge we can move forward with intelligence in devising and subsequently evaluating products.

It is urged that the Navy, through the Navy Cooperative Committee, endeavor to provide industry personnel with a more detailed accounting of performance requirements in all of its military service installations, especially where new problems are involved. Further, it is strongly urged that a thorough understanding of the significance of laboratory tests that are now being proposed, or being imposed, to measure and control quality be made known to industry. The Navy has made important strides in this area but it is not home yet.

Specification preparation . . . The goal in preparing a specification is to put in writing a communication that rigidly defines the floor of quality and yet provides the practical flexibility needed by the vendor in serving his customer. The customer wants to buy on the basis of a standard of performance; assurance of performance is paramount to him. This philosophy applies whether the customer is an industry customer or a military customer.

The military, demanding more widespread availability, has the additional requirement of avoiding specifying proprietary materials, except as a last resort. Only in an emergency should any military specification be built around specific ingredients. A tight, restrictive specification involving a stipulated ingredient or a specification covering a specific proprietary product is indicative of lack of ability to communicate the performance requirements desired.

Another important consideration in specification preparation is realism in the restrictive limits. Let me illustrate: Emphasis today is being placed on the need of a wide spread in the operating temperatures of all greases. For low temperatures, 0° F., —40° F., —65° F., —100° F., are being tossed about as suitable low-temperature levels to be used. Some regard —65° F. as a standard cold temperature regardless of the equipment involved or the possible extremes to which the lubricant will be subjected. Unencumbered by realistic thinking, this or even the lowest figure looks best for all products. But if you use the lowest you may well sacrifice other performance characteristics that are considerably more important. Review performance of MIL-G-10924 greases if you wish. In some cases, there may be realism but too often it is not readily apparent. For instance, why do we add so much sea water to the Navy Type A Lubricating Oil (2 per cent every 20 hours) in the GM-71 test?

Qualitative limits . . . Military specifications are prepared to communicate the requirements on which final agreement has been reached by the staff to the military field personnel and to the vendor. A qualitative restriction in the specification leaves approvals to the discretion or whim of the inspectors. Either the military or the vendor may suffer. The copper-dish corrosion test was a good illustration. The Navy Heater Fouling Test involves a qualitative limit depending on personal observation. In MIL-L-9000A (Ships) it is stated that Class A lubricating oils shall display ability to prevent rusting in the presence of either fresh or salt water, but test method MIL-P-17272 does not specify the duration of the test. Numerical values should be used to determine whether a product passes or fails a specification test. Qualitative type specifications should be used only as a last resort and should be eliminated at the earliest possible moment.

*Manager of Technical and Research Division, The Texas Co. From talk given before Navy Cooperative Committee.

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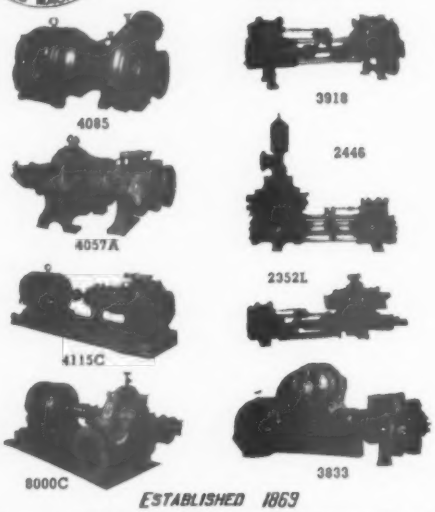

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by W. L. Nelson
Technical Editor

QUESTIONS ON TECHNOLOGY

Freezing Points of Hydrocarbons Vary Widely

"What are the freezing points of various hydrocarbons? Can these be used to estimate the freezing points of jet fuels?" S.M.G.

One of the graduate students at University of Tulsa, Frank Tsai, has recently been making a survey of the freezing points or melting points of hydrocarbons, using mainly the data of A.P.I. Project No. 37.

The wide range of freezing points or melting points exhibited by various hydrocarbons is indicated forcefully by Table 1 which shows the boiling points and freezing points of some of the naphthenic, aromatic, and normal (only) paraffin hydrocarbons found in jet fuels. Thus, in the boiling range of 210° to 267° F. (8-carbon-atom hydrocarbons) the freezing point ranges from 243° F. above zero to as low as 227° F. below zero. It is also clear from Table 1 that hydrocarbons boiling above about 400° F. cannot be included in a jet fuel unless such materials are admixed with other lower-freezing and lower-boiling hydrocarbons which will dissolve the high-freezing material and reduce its freezing point. This is exactly what we find in commercial jet fuels because most of them extend to boiling ranges past 400° F. and usually up to 500° F. (or even 600° F.).

TABLE 1—BOILING POINTS AND FREEZING POINTS OF SOME OF THE HYDROCARBONS FOUND IN JET FUELS

No. of carbon atoms	Boiling points, °F.	Freezing points, °F.
5	40 to 120	2 to —271
6	106 to 177	43 to —244
7	162 to 218	—12 to —217
8	210 to 267	213 to —227
9	252 to 340	68 to —198
10	300 to 357	—27 to —157
11	372 to 397	—14 to —109
12	415 to 435	15 to — 85
13	458 to 469	21 to — 58
14	490 to 502	42 to — 35
15	523 to 534	50 to — 19
16	545 to 563	64 to — 39
17	583 to 590	70 to 14
18	602 to 617	82 to 55

About all that can be gained from Table 1 is the fact that freezing point increases as the boiling point increases and that the freezing points extend over a wide range of temperature.

Examination of the freezing points of specific hydrocarbons indicates that the freezing point will be low if appendagements that unbalance the molecule are present. Stated in another way, if long appendagements are present, the molecule is not symmetrical and cannot easily align itself with surrounding molecules to form a crystalline structure or to freeze. Thus, for some of the hydrocarbons that contain 9 carbon atoms, the freezing points (or freezing ranges) arranged somewhat in the order of increasing symmetry are as given in Table 2.

It will be noted that straight-chain nonane is a more symmetrical structure than most of the possible arrangements of 9 carbon atoms.

In summary, the ranges of freezing point within each series of 9 carbon atom hydrocarbons are:

Paraffins and isoparaffins	+14° to —198° F.
Naphthenes	+61° to —189° F.
Aromatics	—14° to —147° F.

At the present time, adequate laboratory methods of determining the degree of branching or symmetry are not available. Conventional constants for estimating the types of hydrocarbons that are present such as characterization factor, aniline point, refractive index, etc., are of little help. Octane number or cetane number might be helpful but even these tests do not directly measure symmetry or degree of branching.

TABLE 2—FREEZING POINTS OF SOME 9-CARBON-ATOM HYDROCARBONS

Kind of molecule—	Carbon atoms— In main chain or ring	In branches	No. of branches	Freezing point, °F.— Range	Average
Naphthene	5	(i) 4	1		—175
Isoparaffin	5-6	3-4	3	—146 to —198	—172
Isoparaffin	5	4	4	—151 to —185	—168
Naphthene	5	(n) 4	1		—162
Isoparaffin	6-7	2-3	2	—153 to —172	—162
Naphthene	5	4	2	—112 to —189	—150
Isoparaffin	7-8	1-2	1	—113 to —175	—144
Aromatic	6	3	1	—140 to —147	—143
Naphthene	6	3	1	—129 to —138	—134
Aromatic	6	3	2	—113 to —139	—126
Naphthene	6	3	3	— 22 to —123	— 72
Normal paraffin	9	0	0		— 64
Aromatic	6	3	3	— 14 to — 49	— 32
Naphthene	7	2	2		— 22
Isoparaffin (Symm.)	5	4	2 or 4	14 to — 27	— 7
Naphthene	9	0	0		50
Naphthene	8	1	1		61

Solubility of Hydrogen Sulfide in Hydrocarbons

"What is the solubility of hydrogen sulfide in oils?" S.P.C.

Little information regarding the solubility in oils is available but the solubility in several hydrocarbons is (Ellis, C., The Chemistry of Petroleum Derivatives, Vol. 1, p. 423):

	Volume H_2S dissolved*
Water	2.91
Hexane	6.3
Cyclohexane	7.5
Octane	6.8
Dodecane	5.7
Benzene	15.7
Toluene	16.9

*Per unit of solvent (68° F.).

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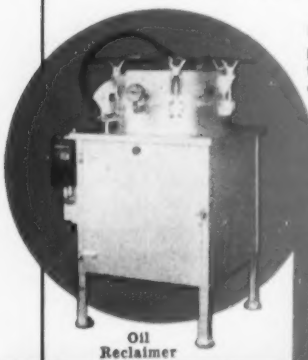

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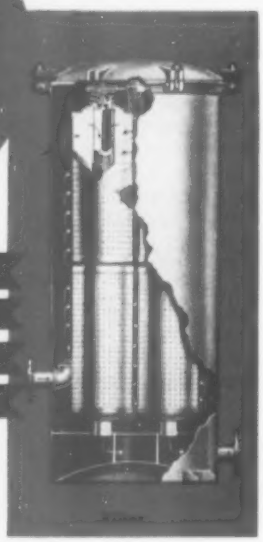

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Cathodic-Protection Monitor

by Marshall E. Parker*

ONE of the biggest mistakes which can be made in the application of cathodic protection is that of neglecting the system after it is once installed. Every component of such a system, whether it employs rectifiers or galvanic anodes, **should** perform its function automatically, with no attention needed for months or even years.

Experience shows, however, that this ideal is not often attained. A large number of different things can happen which will reduce or eliminate the protection being afforded. These can range from power failures, which will generally be taken care of by the utility which supplies the power, to more subtle failures which will not make their presence known. Unfortunately, a partial or total failure of cathodic protection is not accompanied by any visible signs of distress; and by the time it is discovered through the occurrence of leaks, much damage has been done.

Failures may occur either on some part of the system which is supplying the protection, or they may occur on the structure which is being protected. They may be sudden, as by the breaking or cutting of a wire; they may be gradual, as by the deterioration of the coating on a pipe, so that the amount of current originally supplied is no longer adequate.

*Corrosion consultant, Houston.

But whenever and however they may occur, there is one effect which is **always** produced—and that is a drop in the pipe-to-soil potential on some part of the protected structure. An ideal monitoring system, then, is one which is keyed to this one effect, and which is designed to keep watch on pipe-to-soil potential at the point or points which are most likely to be involved in any failure.

These points will in general be those which are most remote from the points of connection of the protective devices—the rectifiers or the galvanic anodes. This is true because a partial failure may only deprive a small part of the line of protection—particularly if the failure is one which involves the line itself, rather than the protective system. For a long continuous line, the critical points are those midway between the rectifiers or anode groups.

Units of Unequal Size

If the units are of unequal size, then the critical point will not be the actual midpoint, but will be located somewhat closer to the smaller unit. If an insulated section of line, between two pump or compressor stations, is protected by a single unit, then one or both end points will serve as monitor stations. The general principle involved is that of selecting points which are electrically remote from the protective units, so that **any** appreciable loss of protection will affect the potential at the chosen locations.

The second criterion for the choice of monitor points is that of accessibility. The ideal location is one which is visited regularly by company personnel in the routine performance of duty. A more dependable installation can be made at less cost, if a point is chosen where there is a company-owned or company-controlled building.

Since the readings are to be taken by personnel other than those in the corrosion department, it is necessary to choose apparatus for permanent installation, not involving the specialized and expensive instruments of the corrosion engineer, and not requiring any special training in their use. The system described, which is not original with the author, has proved itself by successful use over a period of time.

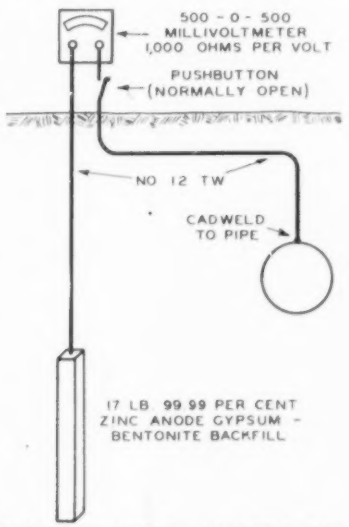
The desired quantity (pipe-to-soil potential) is read with an ordinary panel-mounted voltmeter. One with a center zero is used, reading 500 mv. on either side of center. The reference electrode, instead of the usual copper sulfate, is a permanently buried zinc anode, of the type used for galvanic protection. If the soil resistivity is very low, it may be possible to use a low-resistance voltmeter, but it is safer to standardize on one with a value of 1,000 ohms per volt. A push-button (normally open) should always be included in the circuit, so that the zinc is connected to the line only while a reading is being taken.

Different Values

The value shown on such a meter will not, of course, be the same as that which would be obtained with a potentiometer and a copper sulfate electrode, for two reasons. First, the potential of the zinc is not the same as that of the copper, and secondly, the voltmeter will not usually read the same as a potentiometer. However, with the zinc permanently installed, the readings will be dependable and reproducible.

It is the task of the corrosion engineer, after the installed cathodic protection system is properly adjusted, to take comparative readings with his regular equipment and with the monitor station, and thus arrive at the proper value for its indication. A card should be posted at the meter, giving brief instructions for its use, and stating the values (high and low) which are far enough from the normal to require investigation.

As long as the readings are within the "normal" range, they should be recorded and reported on a daily or weekly schedule. Plotting these values graphically will often yield valuable information about coating deterioration, polarization, variation of current output with soil moisture conditions, and other changes whose effects are too slow for direct observation, and which would not be noticed with widely spaced readings.



PERMANENT INSTALLATION for monitoring pipe-line cathodic-protection system. System is simple and inexpensive; has proved itself in operation.

EQUIPMENT MEN . . . in the News

Pipelife, Inc., Appoints Texas Licensed Operator

Pipelife, Inc., Odessa, Tex., originators of the Pipelife process, has anannounced formation of Internal Pipeline Maintenance Co. of Texas, as licensed operators for Texas. Partners in the new company are William E. (Bill) Denton, G. S. Rice, and William T. Theis.

W. T. THEIS

Denton has been engaged in the oilfield - machinery business since 1938, specializing in pipe-lining procedures and equipment. For the past 18 months he has been vice president and general sales manager of Alvin Hall Machinery Co.

Rice, an electrical engineer, formerly spent 5 years with Caterpillar distributors, and until his new appointment he was vice president of Alvin Hall Machinery.

W. E. DENTON

G. S. RICE

Theis began his engineering career with Phillips Petroleum Co. Prior to his present affiliation, he was chief engineer, Interstate Engineering Co., El Segundo, Calif.

Arthur G. McKee Reelects Directors and Officers

At the annual stockholders' meeting of Arthur G. McKee & Co., recently held in Cleveland, the following members of the company's board of directors were reelected: Robert E. Baker, William A. Haven, J. Krumhansl, Arthur G. McKee, H. H. R. Moorhouse, T. W. Rutledge, and H. E. Widdell.

At the organization meeting following the stockholders' meeting H. E. Widdell was reelected president; Haven, vice president; Moorhouse, secretary; Krumhansl, treasurer, and C. H. Ganzenmueller, assistant treasurer. Myran J. Livingston was elected a new vice president, and he will direct the activties of the company's petroleum-refining division. For the past year Livingston has held the position of assistant to the president. Previously he had been sales manager of the company's petroleum-refining division.

E. H. Edwards Co. Lays Expansion Plans

E. H. Edwards Co., wire-rope manufacturers since 1912, is now headed by a young, aggressive management. Sterling Edwards, son of the founder, is president; Kermit Williams, executive vice president and secretary; Russell Hendrick, vice president in charge of sales; Norman MacEachen, treasurer, and Cynthia Williams, assistant secretary.

Originally serving the 11 western states, this company in the last few years has extended into the Mid-Continent area.

The founder, E. H. Edwards, established the company under his own name in 1912. His first manufacturing operation was the production of wire fish trap netting. He then went into the manufacture of wire rope, and built a manufacturing establishment which contains modern production and testing facilities.

According to Sterling Edwards, president, expansion plans are contemplated which will add materially to the plant. Additions will be added to the rope shop and other sections of the plant. New production will be installed in the near future.

E. H. Edwards Co. management looks over outgoing wire-rope shipment. Left to right: Russell Hendrick, vice president in charge of sales; Kermit Williams, executive vice president; Sterding Edwards, president.

Seismograph Service Names Personnel Advancements

At the April meeting of the board of directors of Seismograph Service Corp., Tulsa, the following advancements of personnel were made, according to G. H. Westby, president.

F. B. LEEDY

F. B. Leedy, formerly assistant treasurer, has been named treasurer and director. R. S. Finn, formerly manager of instrument research, to vice president of Lorac Service Corp., and manager of Lorac Maritime Corp., subsidiary companies of S.S.C. Richard A. Pohly, presently serving as manager of S.S.C.'s gravity division, to vice president.

R. S. FINN

R. A. POHLY

Leedy began his employment with S.S.C. in January 1934, where he has held the following positions: geophysical advisor in Trinidad, B.W.I., party chief and manager of S.S.C.'s operations in Argentina; vice president and manager in Colombia; party chief and manager in the Bahamas, B.W.I.; 1948-51, vice president and manager of operations in Canada, and 1951, assistant treasurer. Leedy succeeds A. B. Chappell, who has retired as treasurer of the company.

Finn joined S.S.C. in 1938 as an electrician. After being transferred to the field, he was sent to Argentina in 1939 and to Venezuela in 1940. He was promoted to senior research engineer in 1945. Finn was made manager of instrument research in 1952, under Dr. J. E. Hawkins, director of research and development.

Pohly was employed by Shell Oil Co. in the research division of geophysical department, and since 1941 he has been engaged exclusively in gravity work with contract geophysical companies. In 1946 he organized Global Explora-

tion Co. and served as general manager. In 1950 he organized a gravity division for S.S.C., and is now serving as manager of the gravity division for that company.

Westinghouse Air Brake Co. Buys George E. Failing

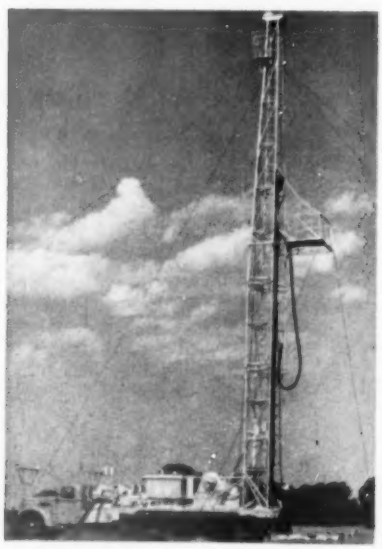
Purchase of the George E. Failing Supply Co., of Enid, Okla., by Westinghouse Air Brake Co., of Pittsburgh, was made public recently in a joint announcement by George E. Failing, president of the company which bears his name, and Edward O. Boshell, chairman of the board and president of Westinghouse.

G. E. FAILING

The Failing company manufactures rotary-type, portable truck and trailer-mounted seismograph shot-hole rigs, core-drill rigs, shallow-production rigs, large hole-irrigation rigs, blast-hole rigs, uranium-mining rigs, electric-logging machines, and a variety of attachments and supplies for the oil industry.

Under the terms of the purchase agreement, Failing will be operated as George E. Failing Co., a subsidiary of Westinghouse Air Brake Co. No change in personnel is contemplated, and Failing will be president of the company.

Export business of Failing is handled



Typical of the equipment manufactured by George E. Failing Co. is the rig pictured here. This is Failing 2500 Holemaster drill which is used exclusively in this country and abroad for oil and minerals exploration, water-well drilling, core drilling, and slim-hole oil production.

THESE Industrial Gearmotors are built to stand up under all conditions. Here's why – quality construction throughout, finest alloys for gears and pinions, accurate alignment, heavy-series ball bearings, rigid cast iron frames and precision production.

A. O. Smith Gearmotors are offered in twenty-one standard speeds ranging from 780 RPM down to 13.5 RPM and in ratings from 1 HP to 50 HP. Standard AGMA Classes I, II and III. Special output speeds and mounting arrangements available on request.

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by George P. Gregory, Jr., New York City. Failing agents and representatives are located in nearly every country outside the Iron Curtain, including France, Germany, Italy, Turkey, Iraq, Iran, India, Australia, New Zealand, Mexico, South America, and Africa.

In addition to the Enid plants there is a branch manufacturing plant in Houston, and branch supply stores in Midland, Tex.; Casper, Wyo.; Hattiesburg, Miss.; Los Angeles, and Edmonton and Regina, Canada.

McCullough Tool Opens New Service Branch

Opening of a new service branch at Magnolia, Ark., was announced recently by Eastern division headquarters of McCullough Tool Co., Houston. This branch will service South and Central Arkansas and parts of northern Louisiana.

The new branch, McCullough's twenty-eighth in the eastern division, has been placed in charge of John L. Berley, formerly of McCullough's Shreveport branch.

Pipelife, Inc., Appoints New Mexico Operator

Pipelife, Inc., originators of the patented Pipelife process which cleans and plastic coats pipe lines internally, in place, has announced the appointment of Internal Pipeline Maintenance Co. of New Mexico as licensed operator,

A. T. MOSELEY

A. CURTIS

with temporary general offices at Artesia.

Officials of the new company are Alfred Curtis, A. T. (Buzz) Moseley, and Newt Hart.

Curtis formerly spent 15 years in maintenance and construction with Humble Pipe Line Co., and 13 years with other pipe lines until his recent company formation.

Moseley has a background of 25 years of sales experience in West Texas, and has been indirectly associated with Pipelife for approximately 2 years.

Hart has been actively associated with pipe-line construction companies in the last several years, and with Pipelife, Inc., a for a number of years.

Well Instrument Opens Houston Plant, Offices

Hubert Guyod, president of Well Instrument Development Co., has announced the opening of the company's new plant and offices at Houston. Well Instrument manufactures electrical-logging equipment for exploration companies, ground-water investigation, and secondary recovery of oil. In addition to the Houston offices the company has the following representatives: Dale Co., Los Angeles; Southwestern Industrial Electronics, represented by R. E. House, Calgary; Southwestern Industrial Electronics in Mexico, represented by Henry G. Escamilla, Mexico, D. F.; Sondage Service, represented by S. J. Vitrac in Casa Blanca, Morocco, and Sociedad Commercial de Materias, Ltd., represented by Benjamin Sondre in Rio de Janeiro.

Continental Motors Opens Sales Office in Tulsa

H. T. CONREY

Continental Motors Corp., Muskegon, Mich, manufacturer of specialized internal - combustion power since 1902, has opened a sales office at Tulsa, according to C. J. Reese, president. This office, which is under Continental's southwestern branch at Dallas, will be managed by Howard T. Conrey.

The expansion, Reese said, was necessitated by the oil fields' steadily widening use of Continental power in production, distribution, and processing. Continental Motors, he added, has recently expanded its line to the point where single or compounded models are available for practically every oilfield job. Technical counsel on oil field and industrial applications will be available through the new facilities.

Harlow Petroleum Co. New Marketing Firm Formed

Offices of Harlow Petroleum Co., new firm specializing in the wholesale marketing of petroleum products, were opened April 1 in Tulsa and Cushing, Okla., according to D. L. Harlow, president.

Harlow Petroleum Co. will market natural gasoline, L.P. gas, and other petroleum products. Harlow formerly served with Sinclair Prairie Oil Co. He has been associated with Petroleum Trading & Transport Co. since 1950, in the position of director of natural gasoline and L.P.G. sales.

Associated with Harlow, in this new company, are: Paul L. Heatley, Jr., Tulsa, secretary and treasurer; and Chester Harlow, Cushing, vice president.

Baash-Ross Announces Top Executive Advancements

L. F. BAASH

F. L. TOOLEY

At a recent meeting of the board of directors of Baash-Ross Tool Co., L. F. Baash, who has been president since the founding of the company in 1920, was named chairman of the

G. D. JOHNSON

T. A. BOYD

board and Frank L. Tooley was elected president. Tooley had been executive vice president.

At the same meeeting G. D. Johnson, formerly vice president in charge of

research and development, was named executive vice president, and T. A. Boyd, formerly secretary and treasurer, was elected vice president, secretary, and treasurer.

Courtney Elected Director, President of Unit Rig

P. COURTNEY

The board of directors of Unit Rig & Equipment Co., Tulsa, have elected Paul Courtney a director and president of the company. Courtney succeeds Ray Carter of Tulsa, who becomes chairman of the board.

Courtney resigned as vice president of Emsco Manufacturing Co., of Houston and Los Angeles, to accept the Unit Rig presidency.

Courtney has been associated with the petroleum industry for many years, working first with oil-field supply companies, and serving several years in foreign service with Shell Oil Co. in Venezuela. Later he was associated with Sinclair Pipe Line Co., pioneered in water-flooding secondary-recovery methods in Oklahoma oil fields, and joined Emsco Manufacturing Co. in 1938.

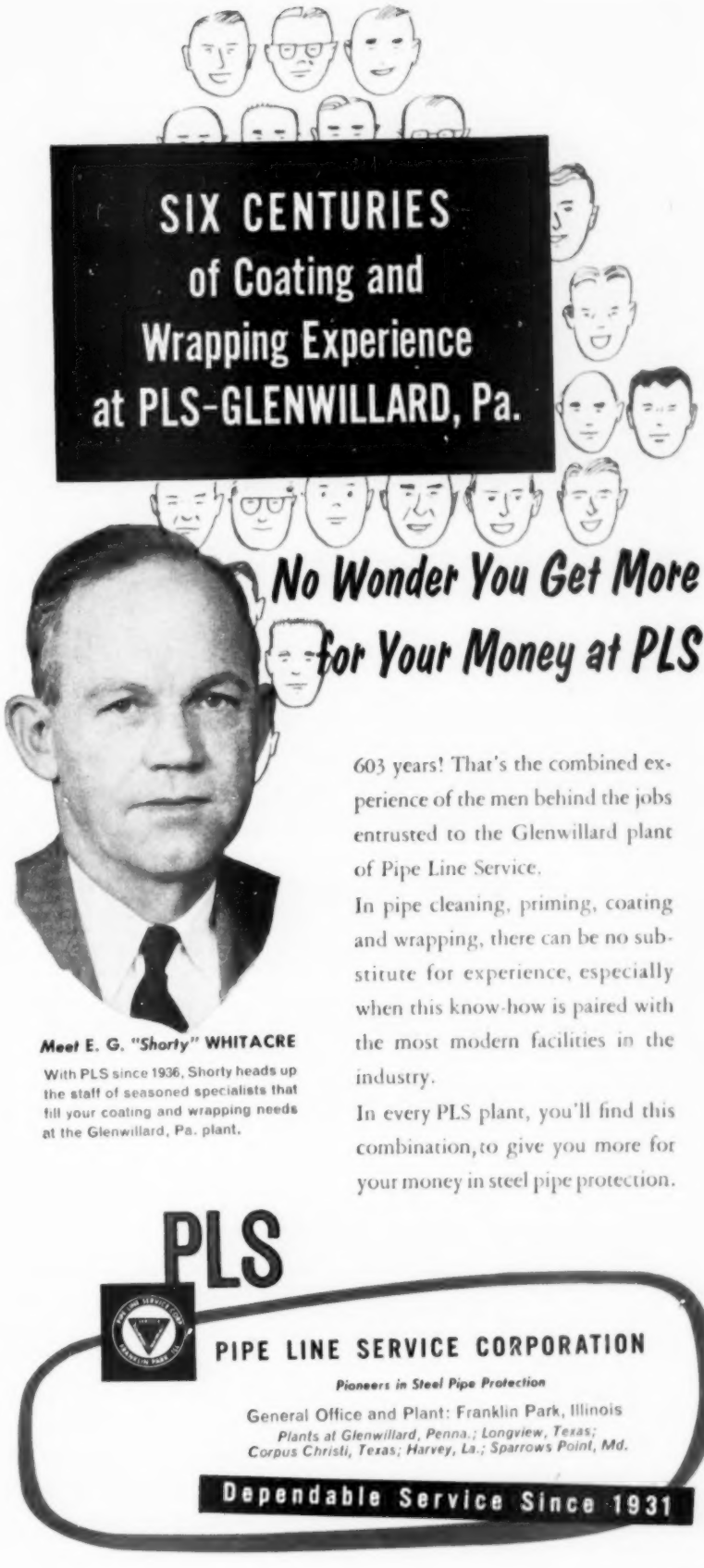
Shantz Named Assistant General Sales Manager

A. A. Shantz, general parts and service manager of G.M.C. Truck & Coach Division since 1944, has been appointed assistant general sales manager, trucks, it has been announced by Philip J. Monaghan, vice president of General Motors and general manager of G.M.C. Truck & Coach Division.

In his new capacity Shantz will have direct jurisdiction over regional and zone activities, national fleet sales, truck technical service and parts.

Shantz started with G.M.C. in the service department in 1928 and was promoted to service-methods manager in 1936, assistant general parts and service manager in 1940, manager of war products service in 1942, and general parts and service manager in 1944.

Henry T. DeHart, formerly G.M.C. truck-advertising manager, was appointed merchandising manager and will be responsible for truck advertising, sales promotions, sales training, parts sales promotion, and used-truck activities. DeHart first became associated with G.M.C. Truck & Coach in 1929 as assistant advertising manager. In 1933 he became advertising and sales-promotion manager.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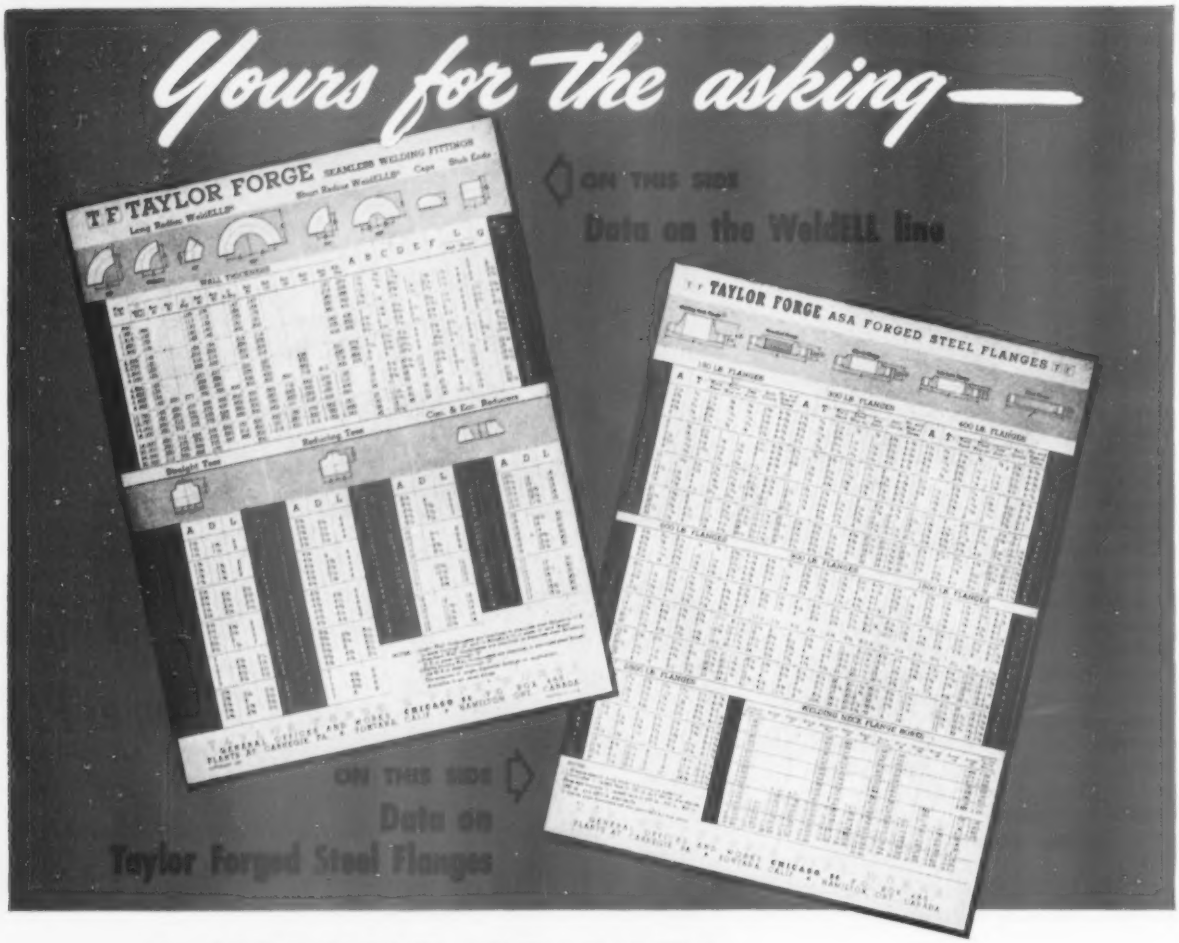

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DIGEST OF NEW EQUIPMENT

IT'S NEW — CHECK IT

TRADE LITERATURE

1 VITRABESTOS is a four-page brochure describing this new reinforced, rugged asbestos pipe-line felt. Brochure discusses nine different product characteristics, and includes typical pipe-line application photographs. *Middle West Coating & Supply.*

2 ALCO PRODUCTS REVIEW, SPRING, 1953, ISSUE presents 32 pages of articles of special interest to petroleum refinery and petrochemical engineers. Brochure includes articles on "Engineering Development of Alco's High-Pressure Closure;" "Choosing the Right Material for Your Heat Exchanger;" "An Over-All Comparison Between Two Pressure-Vessel Codes," and "Around the Petroleum World with Alco." *American Locomotive Co.*

3 CATERPILLAR BULLDOZER LINE. This 36-page catalog contains model views showing every size and style of bulldozer made by Caterpillar and cutaway views illustrating their features. Two pages are devoted to detailed specifications of all Cat bulldozers made for both track-type and wheel-type tractors. Important components of hydraulic and cable controls necessary for Caterpillar dozers are also pictured and manufacturing processes briefly discussed. *Caterpillar Tractor Co.*

4 A DICTIONARY OF CARRIER TERMS. Definitions of 150 terms commonly found in telephone and telegraph carrier equipment literature, are given in this 16-page booklet, which also includes a general discussion of carrier equipment theory. *Lenkurt Electric Co.*

5 FAGEOL - LEYLAND DIESEL ENGINES. This six-page bulletin, printed in two colors and punched to fit standard three-ring binders, covers horizontal and vertical models of both 600 and 680-cu.-in. Fageol-Leyland diesel engines. It is profusely illustrated with photographs, cutaway and section views, horsepower and torque curves, dimensional drawings, and condensed specifications. *Fageol Products Co., Div. of Twin Coach Co.*

6 SAFE - LOCK WIRE - ROPE ASSEMBLIES, Catalog 5201, gives detailed information and drawings on such standard terminals as pin, oval, small ring and large ring eyes, threaded stud, threaded, standard and connector sleeves, standard and safety hooks, standard fork, and wire rope. Assembly photographs and specification charts are included. *Macwhyte Co.*

7 BULLETIN NO. G 1000 describes a new magnetically driven combined motor and centrifugal pump which requires no mechanical seals or stuffing boxes, and contains information covering pump application and construction. Also included are dimension drawings, vacuum-performance charts, and performance curves for all models. *Chempump Corp.*

8 FLEXITALIC SPIRAL - WOUND GASKETS, a loose-leaf folder, describes and illustrates CG-RJ compression-gage spiral-wound gasket which takes the place of standard oval or octagonal rings. Folder contains two pages of dimensions and list prices, and application data sheet. *Flexitallic Gasket Co.*

9 ROLLER CHAIN AND SPROCKETS, a 74-page catalog, contains design and construction data on standard roller chains (illustrations full-size), multiple-roller chains, A.S.A. standard single and double-width chains, roller-

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, May 11, 1953

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chain attachments, and description of chain parts. Dimension and list-price charts on disk and hub sprockets for roller chains are given. Catalog also contains engineering and lubrication sections. *Powers Manufacturing Co.*

10 OIL. This varicolored brochure presents in clever artists' drawings history and development services; plant and facilities of a modern, highly organized well-servicing company; field operations, and manufacturing and research units. *Schlumberger Well Surveying Corp.*

11 PRESSURE & VACUUM ACTUATED SWITCHES. Catalog 1MB-1 describes a full line of pressure and vacuum-actuated switches for industrial applications. The book includes a glossary of terms, wiring diagrams, operating characteristic charts, and engineers' drawings of each instrument. *Barksdale Valves.*

12 UNIT MOBILE CRANES AND SHOVELS. A four-page brochure announces fluid torque drive, a new engineering development in Unit mobile equipment. Brochure also features improved trench hoe attachment adaptable to crawler or mobile machines. Also discussed are wide cast-steel crawler shoes, and full-vision cab. *Unit Crane & Shovel Corp.*

13 TYPE C-350 POWER SLUSH PUMP is described in a new 16-page bulletin, profusely illustrated in color. Bulletin lists 21 features of the pump; describes and illustrates its design, operation, and lubrication, and gives specifications and performance data. *The National Supply Co.*

14 INDUSTRIAL DENVER. This 24-page brochure describes advantages of Denver as an industrial city, and discusses industrial sites suitable for new industry. Brochure also discusses transportation, water, fuel and power, raw materials, city government, schools, and recreation. *Denver Chamber of Commerce.*

15 NEW DOUBLE-X MECHANICAL JOINT PIPE. This 44-page illustrated catalog describes centrifugal pipe in 3 to 48-in. diameter, inclusive. Catalog also contains standard specifications and other useful data. *American Cast Iron Pipe Co.*

16 CONDENSER-TUBE INSERTS, which help to put tubes of heat-exchanger equipment back in operation quickly, are described in a new four-page bulletin. Bulletin explains how inserts restore leaking tubes to service by sealing off deteriorated portion of the tube. *Thomas C. Wilson, Inc.*

17 UNIVERSAL FLEXIBLE METAL HOSE PRODUCTS is a technical data book which includes information on application, temperature ranges of various types of metal and wire braided hose, dimensions, couplings, and assemblies. Types of flexible metal hose illustrated and described include seamless all-metal flexible pressure hose, interlocked suction, blower and conveyor hose, and square-locked conduits and flexible spout tubing. *Universal Metal Hose Co.*

18 WITCO CATALOGUE, a sixth edition, contains complete information regarding company products, plants, and technical literature. Line of chemical products including carbon blacks, rubber chemicals, stearates, driers, esters, plasticizers, vinyl stabilizers, gelling agents, asphaltic mastics, rust preventives, and Witcarbs and special chemicals are fully described as to type, form, properties, applications and packing. *Witco Chemical Co.*

19 LADDER SCAFFOLDS, ROLLING SCAFFOLDS. Bulletin AS-2 describes and illustrates aluminum sectional scaffolding, modern scaffolding with new handling and safety features. Folder contains data on both ladder and rolling types of sections, on-the-job applications, specifications, and illustration. *The Patent Scaffolding Co., Inc.*

20 PLASTIC PIPE BULLETIN. This folder describes plastic pipe known as Black Buty to aid pipe users faced with problems of corrosion. Included are specifications from ½ to 6-in. diameter; estimated working pressures; data on chemical resistance; fittings available, and typical applications. *Anesite Co.*

FOR MORE INFORMATION . . . . use one of these cards

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DIGEST OF NEW EQUIPMENT

IT'S NEW CHECK IT

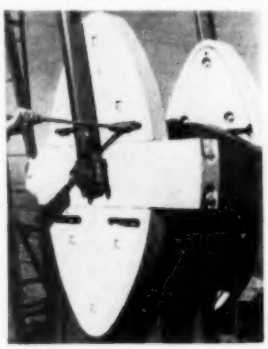
21 **THE GAMA-TRON** is an instrument which rapidly and accurately provides inspection data on pipe thickness with various diameters up to 1-in. thickness. This instrument was developed to meet a demand from the oil and chemical industries where rapid measurements are required, nondestructively, and from one side of the pipe only — that is without actual access to the interior of the pipe. These functions are accomplished quickly and easily with a high degree of accuracy by the use of penetrating gamma rays. The main features of the Gama-Tron, using the principle of a radioactive source and a gamma-ray detector, are its portability, small size, wide range scale, and self-contained battery power supply. However, it can be obtained with 110 volt a.c. operation. The Gama-Tron records direct thickness measurements, eliminating the use of charts and mathematical calculations. The source of gamma rays employed in the Gama-Tron is a needle containing 1 mg. of radium in the form of commercially available salt with a life expectancy of 1,358 years half life. The source is surrounded with a shield containing a window which directs the beam of gamma rays in the desired direction. The Gama-Tron is equipped with a carrying strap, and is supplied with either a 12¾-in. or 8½-in. detector head. *United Engineers, Inc.*

IT'S NEW CHECK IT

22 **NEW CIVILIAN JEEP** is designed to utilize the company's more powerful four-cylinder Hurricane engine recently incorporated in a new model military Jeep. Of F-head design, the Jeep's new engine has a maximum brake horsepower at 4,000 r.p.m. of 72, an increase of 20 per cent over the rating of previous models. The maximum torque has been increased from 105 to 112 ft.-lb. Compression ratio has been increased from 6.5 to 6.9 to 1. Particularly important is the fact that the torque is increased materially at low engine speeds, where high torque is especially desirable. The new Jeep (designed as Model CJ-3B) differs in physical appearance from its predecessor by virtue of a higher hood profile and revised cowl and windshield lines. The cowl is 4¾ in. higher, giving the vehicle a more powerful appearance. Mechanical improvements include a new transfer case giving quieter operation and longer life. *Willys-Overland Motors, Inc.*

IT'S NEW CHECK IT

23 **ADJUSTABLE CRANK PUMPING UNITS.** This series has been field tested for over 2 years, and incorporates the best features of other Cabot units with a new adjustable crank balance. The new crank eliminates heavy lifting, complicated tools, and makes weight adjustment an easy one-man job. The crank arm is stopped in an approximately horizontal position and the crank adjusted as follows: the two lock bolts on each of the weights are loosened. Weights are moved to the desired position by turning the adjuster bolt and the lock bolts are tightened. It is done by one man without special tools and all four weights can be adjusted with the crank arm in the same position. Single-piece inner weights can be added by lifting them into place and securing them with three bolts. The complete series ranges in sizes from 9,000 to 32,000 lb. maximum polished-rod load. *Cabot Shops, Inc.*



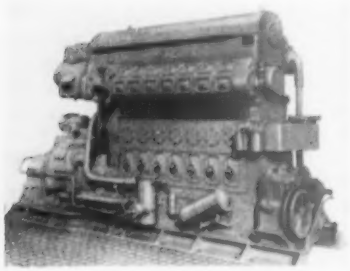
IT'S NEW CHECK IT

24 **NEW OPPOSED PISTON DIESEL** is designed for heavy-duty applications although it is a fraction of the size and weight of conventional heavy-duty engines. The new model 38F5¼ diesel has a 5¼-in. bore and 7¼-in. stroke and develops a continuous duty rating of 75 hp. per cylinder at 1,200 r.p.m. Although the engine is compact and light (the 225-hp. unit weighs 7,100 lb.), the builder has not sacrificed strength at any point. Design of the engine is characterized by a pair of pistons in each cylinder, operating in opposite directions so that the heads of the pistons form a common spherical combustion space.

KEEP INFORMED ✓SAVE TIME ✓TEAR OUT CARD ✓CHECK IT ✓MAIL IT

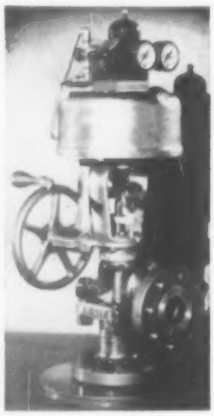
This Digest of New Equipment offers you a quick resume of important features of new or improved products and trade literature and the opportunity to obtain complete information on each subject by use of the convenient "CHECK IT - MAIL IT" service card.

The upper pistons, controlling the scavenging air inlet ports, are connected to an upper crankshaft, and the lower pistons, controlling the exhaust ports, are connected to a lower crankshaft. Connected by a vertical splined quill shaft, the upper and lower crankshafts work together to transmit power to the drive end of the lower crankshaft. The engines are complete self-contained units incorporating all necessary pumps, heat exchangers, filters, and other auxiliaries for the pressure-lubrication system, the closed cooling-water circuit, and the diesel mechanical injection fuel system. *Fairbanks, Morse & Co.*



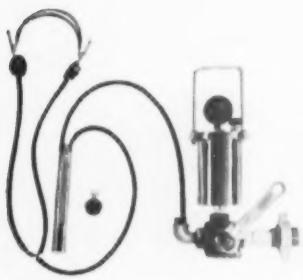
IT'S NEW CHECK IT

25 NEW COMBINATION AUTOMATIC AND MANUAL CONTROL VALVE. Photo shows the side-mounted handwheel mechanism, developed in answer to field demands for positive supplementary control during startup periods, or when the system is shut down temporarily for instrument repair. The automatic operating principle of the Domotor valve employs a sealed piston which is actuated by internal pressures, combined with a built-in null-type positioner assuring powerful and positive valve action, with petitioning accuracy up to 1/1,000 of valve travel. Standard series Annin Valves withstand operating pressures to 5,000 psi. with special applications to 50,000 psi. Effective temperature ranges from —100° to 450° F., the latter with Teflon packing. *The Annin Co.*



IT'S NEW CHECK IT

26 THE FLUID LOG. A portable instrument light enough to be carried in the pumper's truck is a means of quickly determining the fluid level in oil wells. The instrument is attached to the well head by means of a wing union. The fluid level of a well can be determined in less than 5 minutes. Being manually operated, no wires or batteries are required to send the pressure waves down the well, this being accomplished by means of a simple tuning fork. Pulling jobs can be eliminated where instrument shows well has been pumped down. Instrument will determine if pump is seated. Permits inexpensive reservoir analysis, and bottom-hole-pressure computation. *Howard Supply Co.*



IT'S NEW CHECK IT

27 THE RED SEAL SHAFT SEALING UNIT. The unit consists of a standard gear reduction which reduces the speed of each contact disk to one-tenth that of the main shaft. In addition to the positive-speed geared disks, there are intermediate floating contact disks that theoretically reduce the speed between the geared disks by 50 per cent. Since the stationary contact member is supported by a metallic diaphragm, all contact members are very flexible and shaft vibrations will not affect the contact life. Elliptical shape of housing and other features make it suitable for extreme pressures. All small static clearances that incrustation or foreign matter cause in activity are eliminated. Seal mechanism can be operated in oil bath and be completely independent of fluid being pumped. Shaft sleeve wall is thick enough to bore for many shaft sizes. *International Industries, Inc.*

IT'S NEW CHECK IT

28 DOPESTER is a simple and economical thread-lubricant applicator, designed to eliminate the old hand-brush method for greater efficiency and saving of expensive lubricants. The Dopester consists of an aluminum cone-shaped applicator with a simple hand grip and laminations of sponge rubber which fit neatly into the tool joint, squeezing out an even flow of lubricant on the threads. With the unit is included a baffle for the standard lubricant can which keeps it covered and provides an effective method of picking up lubricant from the pail and charging the applicator. This equipment is light in weight, yet sturdy and practical for oil-field use. It has been in operation in the oil fields for several months, and contractors report up to 50 per cent savings in lubricants through the use of this method. *E. W. Forrow Co.*

IT'S NEW CHECK IT

29 SERIES OF FOUR-CYCLE SUPAIRTHERMAL V-TYPE engines are for stationary services. They are built in 12 or 16 cylinders of 13-in. bore and 16½-in. stroke covering a range from 2,400 to 4,260 hp. at 450 to 600 r.p.m. The design of these engines incorporates all performance features of Nordberg 13-in. bore in-line Supairthermal engines and many of the important parts of the V-Type engine are identical and interchangeable with the in-line type engine. The Supairthermal principle of operation gives substantially more horsepower per cylinder at

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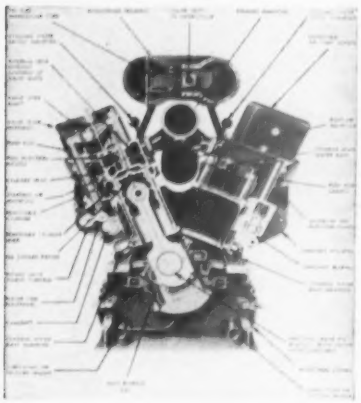
high thermal efficiency. Nordberg Supairthermal V-Type engines are built for liquid fuel, dual-fuel or spark-fired gas operation. As a diesel, the engine burns a wide range of fuel and crude oils. For dual-fuel operation, the engine burns various types of gaseous fuels with only a small percentage of pilot oil to control combustion. In case of any interruption in gas supply the engine will automatically change to liquid fuel without affecting speed or load. As a spark-fired gas engine, it will burn natural gas, butane, propane, manufactured gas, and sewage gas using a dual spark-ignition system. The cross-section shows the compact design and heavy-duty construction. The included angle of the two banks of cylinders is 45° and the offset between cylinders working on each crankpin is 4¾ in. The net weight of the 12-cylinder engine is 96,000 lb. and the 16-cylinder engine, 122,000 lb. This does not include the weight of the flywheel and extension shaft on stationary engines or the flywheel, thrust bearing, or thrust shaft for marine engines. *Nordberg Manufacturing Co.*

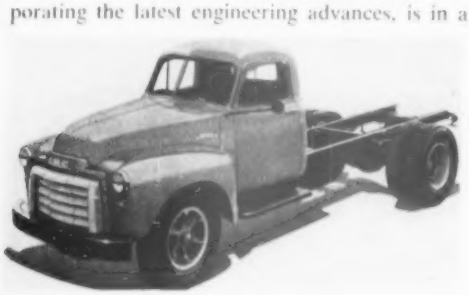


IT'S NEW CHECK IT

30 50-LB. SACK FOR QUADRAFOS. Quadrafos is the first glassy polyphosphate mud conditioner to be made available in a convenient 50-lb. sack. Photograph shows the first shipment of Rumford Quadrafos in the new package leaving the company's plant at Rumford, R. I. The new sack which supplements Rumford's standard 100-lb. sack, has a high wet-strength, is polyethylene-lined, and multiwalled. *Rumford Chemical Works.*

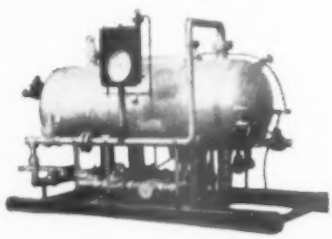
IT'S NEW CHECK IT

31 NEW G.M.C. 270-CU. IN. TRUCK ENGINE incorporating the latest engineering advances, is in a 2½-ton G.M.C. truck model that will reach new peaks in performance. Successor to the old G.M.C. 270, the new engine, of 130 hp., is in the new G.M.C. model 400-27, rated at 18,000 lb. G.V.W. and 30,000 lb. G.C.W. Horsepower of the new engine not only has been increased 11.3 per cent over the former 270, but the compression ratio has been stepped up from 6.75 to 1 to 7.5 to 1, standard-grade fuel still being used. The new model has optional wheelbase of 137, 149, 161, 179, and 197 in., integral cast-spoke-type wheels, 8.25/20 10-ply front and dual rear tires with 9.00/20 10-ply tires optional, and optional body types of 9 or 12-ft. platforms or stakes. The front axle is rated at 4,500 lb. capacity while the rear axle is 15,000 lb. two-speed electric-shift with single-speed optional. The new 270 engine has a stress-relieved "Tocco" hardened crankshaft, a new combustion chamber and flat-top aluminum pistons, improved manifolding and ignition, stronger cylinder block, crankcase, and cylinder head, plus the Moraine M-400 main and connecting-rod bearings. *G.M.C. Coach & Truck Division, General Motors Corp.*



IT'S NEW CHECK IT

32 NEW TEST SEPARATOR for tesing individual oil and gas wells is designed to separate the well fluid into the three phases of oil, gas, and water; meter each of these fluids accurately; sample the oil automatically to determine the water content; and discharge each fluid separately or recombined as desired. The unit is for permanent installation at lease manifolds or tank batteries to replace conventional oil and gas separators and test tanks. Advantages of the test separator are lower over-all cost and lower installation cost. Individual wells can be tested without shutting down other wells. It is not necessary to have a separate test tank to flow the liquid into, since the meters will accurately measure the production from the well. Wet wells can be tested with much less trouble and expense because this unit will separate the well fluid, meter, and sample it, and discharge the liquids into the regular production treating system. Pictured is Model 30WT-01O6S which will handle up to 1,800 bbl. per day of oil, 900 bbl. per day of water, and 4.0 M.M.s.c.f. per day of gas at 125 psi. W. P. test separators are available in any size and working pressure required. *Oil Metering and Processing Equipment Corp.*

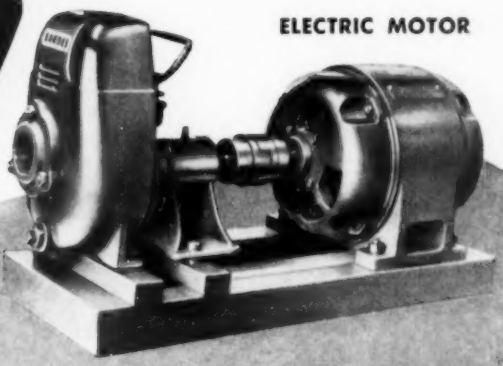


IT'S NEW CHECK IT

33 KONTOL 77 CORROSION INHIBITOR. A new oil-soluble organic corrosion inhibitor is especially designed to prevent corrosion and rust formation in pipe lines, tankers, and storage. Kontol 77 has been developed for protection against acidic components found in crude oils and has been demonstrated to be effective against rusting caused by the presence of oxygen in finished petroleum products. Employing A.S.T.M. Test D-665, aviation-grade gasolines are rendered nonrusting when inhibited with only 3 p.p.m. of Kontol 77. The product has no adverse effects when used in high-quality petroleum products. For example, 100/130 octane gasoline inhibited with 14 p.p.m. of Kontol 77 exhibits no change in color, octane number, accelerated gum, precipitated lead, or other aviation-gasoline specifications. *Tretolite Co.*

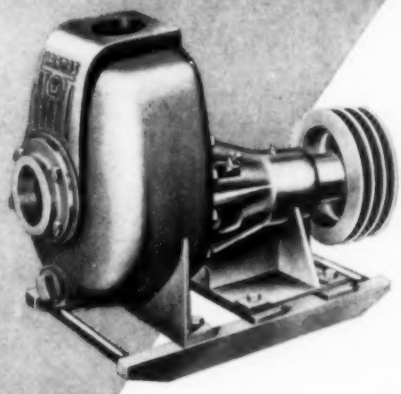
Take Your Choice!

ELECTRIC MOTOR

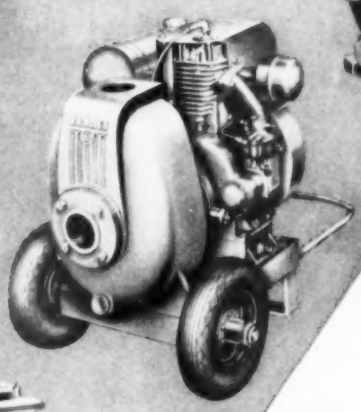


BARNES "33,000 FOR 1" PUMPS AVAILABLE IN 4 TYPES OF DRIVES

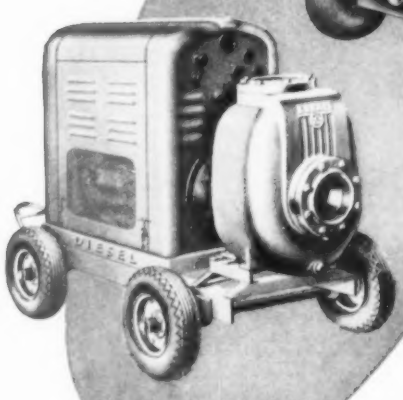
PULLEY DRIVE for use with existing power sources



Barnes Manufacturing Co. Mansfield, Ohio



GASOLINE ENGINE



DIESEL ENGINE

And whichever type of drive you choose, your choice will result in more of everything for your pumping dollar!

Barnes gives unmatched economy — 33,000 gallons of water pumped for each gallon of gas burned! Barnes gives unmatched lows in maintenance costs! Barnes gives unmatched, trouble-free service life! And Barnes Self-Priming Centrifugal Pumps give unmatched highs in overall performance. These are the reasons why Barnes Pumps are the choice of men who know pumps and pumping!

See These Better Pumps at the Barnes Exhibit
Park Lane 6 and 7
Oil Show—Tulsa, May 14-23

The Complete Line of Barnes 33,000 for 1 Pumps, Ranges from 3,000 to 90,000 G.P.H. AGC Rating.

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Among the Drilling Contractors

Tulsa Firm Has South Offset Contract at New McClain Pool

Parker Drilling Co., Tulsa, has been awarded contract for the south offset test to new deep North Frenny pool in McClain County, recently opened by Jay Simmons et al 1 Wilson, C SE SE 14-8n-4w.

The offset test will be Simmons 1 Kidwell, C NE NE 23-8n-4w.

Fleet Drilling Co. has contract for Simmons et al 1 Johnson, E½W½ SW SW 13-8n-4w, a new 11,000-ton test offsetting the discovery well of the new field to the east. The discovery well of the field, Simmons 1 Wilson, has been flowing about 20 bbl. of oil per hour from the Tulip Creek at 10,447-88 ft.

Rocky Mountain Drilling Co. has contract for Canada Southern Oils, Ltd., 6-14 Dewar, LSD 6, 14-31-26w3, 4½ miles northeast of Husky-Phillips 1 Dewar, detrital oil discovery and 7 miles southwest of the Driver area. The new test is about 12 miles southwest of Coleville field in Saskatchewan.

Palmer Drilling Co. and Can-Tex Drilling Co. have contracts on Shell Oil Co.'s recent indicated Mississippian oil discoveries in the Midale region of the Williston basin area of southeastern Saskatchewan. Palmer is contractor on the 2 Estevan, where recoveries of up to 180 ft. of free medium-gravity oil were made on tests, and Can-Tex is contractor for 1 Estevan, where more Mississippian oil shows were found on tests. The Shell 2 Estevan well is 28 miles southwest of the recent Forget light oil discovery and 41 miles northeast of the 1952 Ratcliffe light-gravity oil discovery.

Salina Drilling Co. has contract for Fidelity Royalty Co.'s 1 Van Sickel, NE NE SE 26-25s-12w, wildcat 5 miles southeast of Leesburgh pool in the southeastern part of Stafford County, Kansas, on the Central Kansas uplift.

Stag Drilling Co. has contract for a new wildcat on the Central Kansas uplift at Dozier Oil Co.'s 1 Demel, SE SE NE 27-17s-12w, wildcat 3½ miles northeast of Redwing pool in Barton County, Kansas.

Commonwealth Drilling Co., Ltd., has contract for a new wildcat at Tide Water Associated Oil Co. 1 Wood River Crown, LSD 4, 18-10-20w3, 3 miles southeast of Gravelbourg, and about 6 miles northwest of last year's Quintana Melaval wildcat, which was dry at 7,904 ft.

General Petroleums of Canada, Ltd., has been awarded drilling contract for a new test on the west side of Big Island at the southwestern end of Great Slave Lake in the Northwest Territories of Canada for Northwest Territories Petroleums, Ltd. The company is shifting drilling equipment from their first 1953 test in the area to the new drill site, the 2 Big Island. The first

Pictured here is the drilling crew of Welch & Olsson Drilling Co., Inc. Wichita firm. Location is the 1 Simon Stucky estate, NW NW SE 12-18s-2w, semiwildcat ¾ mile west of production in Georob field in northeast McPherson County, Kansas. (Left to right) Ervin Neighbors, derrick man; Jack Parret, driller; Earl Coppenger, floorman; Walter Rugan, floorman.

Unconditionally Guaranteed

Your drill strings literally hang by a thread, so get the thread compound that is unconditionally guaranteed to give efficient sealing, protects against galling and seizing, allows easy break-out . . . Bestolife Lead Seal Tool Joint and Casing Compound. The Standard of the Oil Country for over 20 years. Sold at supply houses throughout the world. Packed in 1¼, 5, 20 and 50 lb. containers.

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For maximum results with a minimum use of steam, use an INFERNO Steam Stack Blower. Increases boiler capacity up to 400% above rated capacity. Long life, streamlined design. Write for Bulletin 22-A.

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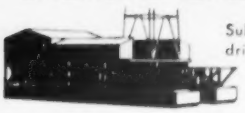
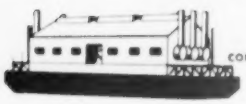
BUILDS FINE SPECIALIZED MARINE EQUIPMENT FOR THE PETROLEUM INDUSTRY



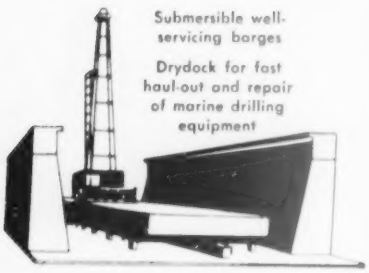
Submersible drilling barges

Tugs



Boiler and compressor barges

Water, oil, and supply barges



Submersible well-servicing barges

Drydock for fast haul-out and repair of marine drilling equipment

Levingston is not only located conveniently with respect to marine drilling operations on the Gulf Coast, but here you will find marine engineers and constructors who understand the language of oil operators. Bring your marine petroleum equipment problems to Levingston *first* for a quick economical solution.

Levingston

SHIPBUILDING CO.

Orange, Texas

test, 1 Big Island, also located on the southwest edge of Great Slave Lake, was dry at total depth of 1,357 ft.

Braden Drilling Co. will make the hole for Aladdin Petroleum Corp. 1 Christopher, NE SW SE 13-19s-12w, wildcat ¾ mile north of Northwest Werner-Rohl pool, 2 miles north of Ellinwood, Barton County, Kansas.

Fleming and Woodman have contract for Leon Huff 1 Evers, NE NE SE 4-19s-14w, wildcat 2 miles north of Heizer pool and 5 miles northwest of Great Bend in Barton County, Kansas.

Badger Drilling Co. has contract for Schermerhorn Oil Co.'s 1 Pendergast in SW SW NE 27-19s-15w, wildcat 3 miles northeast of Behrens pool in the western part of Barton County.

Trans-Era Petroleum will make the hole for D. D. Dunlap - Snyder "D," NW SW SE 30-10s-10w, rank wildcat about 38 miles northwest of nearest production in Russell pool. The rank test is located in the Salina basin in Lincoln County, Kansas.

Exploration Drilling, Inc., has contract for a deepening job at Walter E. Sistrunk 1 Berry M. Wheeler, 109 ft. from south line, 107 ft. from east line of Section 9-11s-9e, Itawamba County, Mississippi, in the Black Warrior basin. Old total depth of the hole was 990 ft. Proposed depth of the deepening job is the Iowa limestone.

Crow Drilling Co. will handle contract for Union Producing Co. A-2 Stevens, 662+ ft. from south line, 658 ft. from west line, Section 19-4n-9w, in Glazier field, Perry County, Mississippi. The Eutaw sands will be the well's objective at about 7,400 ft. The well is the northwest offset to the field's confirmation well.

ACTIVE ROTARY RIGS*

Area—	Week ended 5-4-53	Change week ended 4-27-53	Change week ended 5-5-52
Gulf Coast	616	+17	+ 6
N. & W. Tex.-N. M.	798	— 3	—259
Ark.-N. La.-E. Tex.	120	— 8	— 23
Oklahoma	348	+26	+ 2
Kansas-S. Nebraska	188	+12	+ 11
Illinois-Eastern	121	— 1	— 4
Rocky Mountains	225	+11	+ 27
Pacific Coast	168	— 1	+ 9
Total U. S.	2,584	+53	—231
Western Canada	142	— 5	— 19
Total	2,726	+48	—250

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States, Gulf Coast, and Arkansas-North Louisiana-East Texas are shown on pages 189 and 190.

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and in the Oil Business — It's both Pleasant and Profitable to . . .

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An Oil Bank . . . directed by Oil Men in the oil capitol of the World.

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THE FIRST NATIONAL BANK AND TRUST CO. OF TULSA

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Standco NO-SMOKE

STANDCO BRAKE LINING

Is the driller's best friend because it makes the easiest brake known and "feeds off evenly while drilling." It never scores brake rims. See pages 4811-4830, Composite Catalog.

Standco Brake Lining Co.

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- VALVES
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Peerless Supply Co., Inc.

L. D. 75 & 76 P. O. Drawer 36-A

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. . . WE'LL DO IT FOR YOU LIKE CLOCKWORK!

Our specialists save you time, money and worry when packaging and processing regulations must be met. Call The Tulsa Crating Company for:

PACKAGING for export or domestic shipment.
SCIENTIFIC PROCESSING against corrosion, moisture, air dust, all climatic conditions.
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Kinzbach Whipstocks can be set at any depth and require no support for the bottom. Positive setting slips prevent slipping or turning in the hole. The Kinzbach hinge arrangement assures that the top of the Whipstock will be close against pipe wall at all times, permitting easy passage of drilling tools. Setting trigger always locates the Whipstock between couplings so that the window will be within one joint. Kinzbach Whipstocks are available in all popular casing sizes through your supply store.

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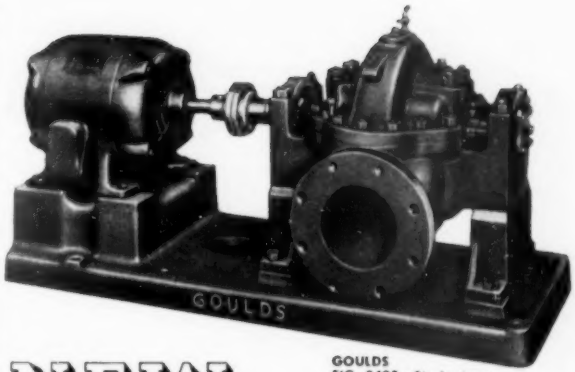


GOULDS
FIG. 3405—Single stage, double suction centrifugal pump. Heads to 260 ft. Capacities to 6400 G.P.M. For general purpose pumping.

NEW

GOULDS PUMP GIVES YOU 5 BIG COST ADVANTAGES

1 ***Combines seven design features that mean high operating efficiency and low maintenance.***

Every one of the following construction features is standard with this new design:

a. Renewable stuffing box bushings.
b. Bearing housings sealed against moisture and dirt.
c. Cowl-type glands suitable for use with quenching liquid.
d. Stainless-steel impeller keys.
e. Teflon water-seal rings.
f. Die-formed stuffing box packing.
g. Corrosion-resistant gland bolts.

2 ***Interchangeability of parts.***

Only three shafts and rotating parts assemblies provide for 19 pump sizes. This means you get:

a. Great flexibility in making field changes.
b. Low initial cost due to standardization of manufacture.
c. Reduced spare parts inventories.

3 ***Saves floor space.***

Short bearing spans cut over-all lengths as much as 50%.

4 ***Flexibility of stuffing box.***

You can use either conventional stuffing boxes or mechanical seals—and change from one to the other.

5 ***Easy rotation change.***

You can change from right- to left-hand rotation or vice versa in the field without construction change because of an unique device locking shaft sleeves.

GET FULL DETAILS from the 12-page illustrated bulletin No. 721.6. Contact your nearest Goulds representative or write to Goulds Pumps, Inc., Seneca Falls, N. Y.

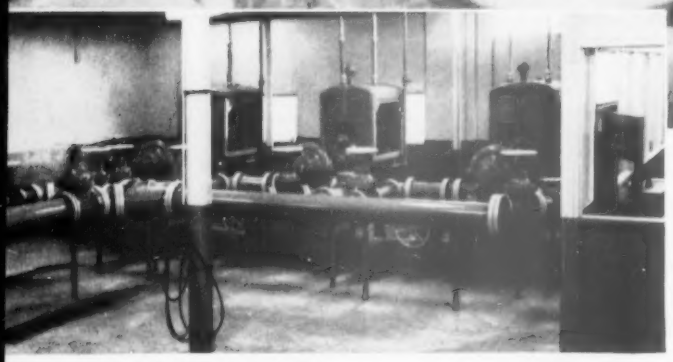
Goulds PUMPS INC.
Seneca Falls
New York

Testing the performance on which BS&B reputation has been built:

Pre-Proving CLIMAX CONTROLS to Insure On-The-Job Efficiency

Experimentation is the first step in final development. This interesting corner of the new Climax Hydraulics and Experimental Laboratory at BS&B's Tulsa plant is under the charge of experienced development engineers. New Climax designs and improvements start here.

The finished control on the "torture rack." Meter runs flow test the valves up through 10". Strain gauge equipment analyzes forces and stress under performance. Control panel in background regulates engines driving the pumps and registers flow data for calculation.



Pump manifolding for the 3 engine-driven pumps which will deliver up to 4500 gallons per minute at a 100 lb. discharge for high volume tests. Pumps can also be manifolded for series operation, in which case 300 lbs. of water at 1500 gallons per minute can be delivered.

There's no question about a Climax Control giving the satisfactory service for which it is designed. That performance is tested and proven before the control goes into the field . . . checked for minimum and maximum capacity. Flow, flow effects, valve characteristics and strain results are all evaluated by experienced engineers. Through the new BS&B Climax Control Hydraulics laboratory come a continuing series of answers to the more efficient, safe and profitable application of automatic controls. One test suggests another, one application is adapted to a similar problem. The net result: Through research, better engineering, and accurate pre-testing, comes a more efficient Climax Control.

New Climax Controls Hydraulic and Experimental Laboratory

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CLIMAX BS&B CONTROLS OUR 50TH YEAR

REFINING

Refiners to Meet

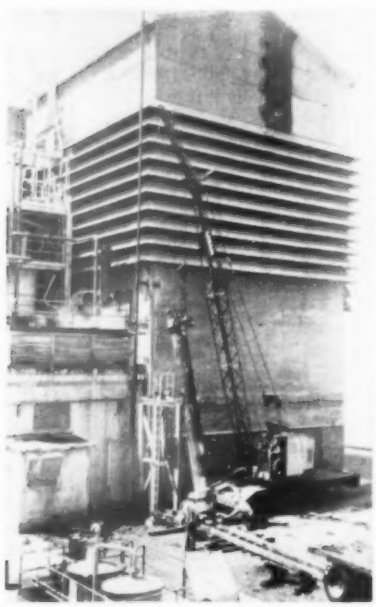
W.P.R.A. sets regional conference for May 28-29

WICHITA.—A regional technical-industrial relations meeting will be held at the Broadview Hotel here May 28-29 by the Western Petroleum Refiners Association.

A tour of the modernized Vickers Petroleum Co. refinery at Potwin, Kans., the second day will provide one of the highlights of the meeting. There guests will see the new Thermofor catalytic cracking packaged unit put on stream several weeks ago. A paper describing the construction and operation will be given before the tour.

J. H. Eppard, process engineer for Blaw-Knox Construction Co., Tulsa, will present a paper on "Development of Residuum Coking" the morning of May 29. Coauthors are W. F. Simms and F. D. Parker.

Industrial-relations speakers will include C. L. Stinnett, assistant personnel director, Lion Oil Co., El Dorado, Ark.; Jack Tharpe, industrial-relations superintendent, Stanolind Oil & Gas Co., Tulsa; and W. E. Blazier, personnel director, Beech Aircraft Corp., Wichita.



Shell Adds Equipment

A Shell Oil Co. crew here prepares to hoist into position a high-pressure vessel at the company's Martinez refinery near San Francisco. The 19,000-lb. forged-steel pressure vessel is capable of withstanding an internal pressure of 2,700 psi. The crew is using a 15-ton self-propelled crane, also employed for general construction and repair work around the refinery. Shell's Martinez refinery has a crude-charge capacity of 45,000 bbl. per day.

New Refinery on Stream

MINNEAPOLIS.—The new $7,000,000 refinery of International Refineries, Inc., at Wrenshall, near Duluth, has gone on stream and is processing Canadian crude oil.

The company has a 10-year purchasing contract for Alberta crude with Interprovincial Pipeline Co., Ltd. Interprovincial's pipe line ends at Superior, Wis., but is being extended to Sarnia, Ont.

The Wrenshall refinery has a daily capacity of 11,500 bbl. High cost of rail transportation on crude from Williston basin wells in North Dakota and Montana causes Canadian oil to be cheaper, H. M. Baskerville, Sr., International president, said.

Lubrication Course Planned

BOSTON.—A 2-week special summer program on lubricating engineering techniques will be offered at Massachusetts Institute of Technology for industry engineers June 16-26.

Prof. Brandon G. Rightmire, in charge of the lubrication laboratory at M.I.T. mechanical engineering department, will supervise the course. Assisting him will be prominent industrial lubrication experts and other M.I.T. staff members.

These topics will be included in the course: theory of hydrodynamic lubrication and its application to the design of thrust and journal bearings; fundamentals of dry and boundary friction; bearing materials; fluid lubricants and greases of all kinds, including the various synthetic types; solid lubricants; gear lubrication; lubrication of rolling-contact bearings; lubrication systems; and plant maintenance.

Safety Record Established

SAN FRANCISCO.—Two million man-hours of work have been completed at Standard Oil Co. of California's Richmond refinery by April 19 without a lost-time accident, the company has announced.

A recent report said 3,550 plant employes have set up an accident frequency rate this year of 0.86 accidents

NATIONAL AIROIL FUEL OIL - GAS BURNERS SERVING INDUSTRY FOR 41 YEARS

- Steam Atomizing Oil Burners
- Mechanical Atomizing Oil Burners
- Low Air Pressure Oil Burners
- Rotary Oil Burners
- Industrial Gas Burners
- Combination Gas and Oil Burners
- Tandem Block Combustion Units
- Fuel Oil Pump Sets
- Retractory Burner and Muffle Blocks
- Valves, Strainers, Furnace Windows

Detailed information gladly sent you upon request.

Also, Automatic Oil Burners for Homes, Churches, Apartment Houses, Factory Buildings and Office Buildings.

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EMPLOYEE HOUSING
Anywhere ★ Anytime!

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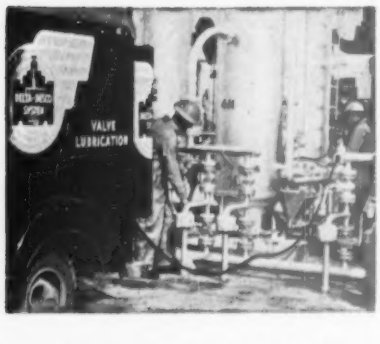
DESCO can Lubricate and Adjust YOUR VALVES *cheaper and better* than you can!



Yes, we will give you odds that a Desco Valve Lubricating Crew with a Desco mobile unit can not only lubricate and adjust your lubricated valves better—*but save you money by letting Desco do it!*

Every Desco service truck is completely equipped with every possible tool and fitting to service valves in minutes where it usually requires hours. Desco high pressure grease equipment can deliver 180 pounds of lubricant per hour. Figure for yourself the man-hours we save—AND THIS SAVING IS PASSED ON TO YOU! What's more you are assured of your valves being serviced at the proper intervals and with the CORRECT LUBRICANT.

MAKE US PROVE IT!

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per million man-hours worked. National Safety Council figures show the national average for the petroleum refining industry was 7.17 accidents per million man-hours in 1951.

Current Oil-Tax Receipts Well Ahead of Last Year

WASHINGTON.—Treasury revenues from the four federal oil taxes for the first three quarters of the current fiscal year ran approximately $143,000,000 ahead of the same period a year ago, it was reported last week by the Internal Revenue Bureau.

Increases of $144,180,000 from gasoline, $7,537,000 from diesel oil and $549,000 from pipe-line transportation were offset in part by an $8,831,000 drop in receipts from lubricating oils.

The bureau announced its 9-month collections included $674,912,109 from gasoline, against $530,732,314 a year ago; $11,221,140 from diesel oil against $3,684,187; $54,617,169 from lubricating oils against $63,438,550, and $20,579,096 from pipe-line transportation against $20,030,165.

ASPPA to Open Bids for Avgas, Lube Oils May 27

WASHINGTON.—The Armed Services Petroleum Purchasing Agency is inviting bids, to be opened May 27, for the supply of approximately 859,000 bbl. of aviation fuel and 7,490 bbl. of lubricating oils, to be delivered on demand to 33 Air Force and Navy fields during the fiscal year beginning July 1.

Because of the uncertainty of the volume of operations, ASPPA is not asking for bids on specific quantities but estimates that requirements of the various fields will approximate 2,306,000 gal. of 115/145 aviation gasoline; 11,266,200 gal. of 100/130; 4,394,000 gal. of 91/96; 81,000 gal. of 80; 18,037,000 gal. of JP4 jet fuel; 292,687 gal. of grade 1100 lubricating oil and 32,772 gal. of grade 1010 lubricating oil.

Refining Briefs

WASHINGTON.—Publicly announced cash dividend payments by oil-refining corporations totaled $236,800 in March against $227,600 in the same month last year, according to a survey by the Department of Commerce. For the first quarter of the year, refiners distributed $243,100, against $236,700 in the same 1952 period.

PITTSBURGH.—Shell Chemical Corp. has opened a new storage and shipping terminal at Industry, Pa., designed to give improved service to Pittsburgh-area customers. The 15-acre terminal includes more than 2,500,000 gal. of storage facilities for acetone, alcohols, ketones, and other chemicals.

HOUSTON.—Dr. Leland I. Doan, president of Dow Chemical Co., has announced the polyethylene plant the firm plans to build at Freeport, Tex., will cost from $10,000,000 to $12,000,000. Capacity of the plant has been estimated at 25,000,000 lb. of polyethylene annually. Completion is expected by January 1955.

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NATURAL GAS

FPC Overruled

Panhandle expansion order reversed by appeals court

PHILADELPHIA.—The U. S. Circuit Court of Appeals has overruled a Federal Power Commission order that Panhandle Pipe Line Co. must enlarge its facilities to provide expanded service to customers.

Panhandle appealed from the FPC order of August 31, 1951, which directed the company to "take steps to eliminate discrimination" in customer service. In its decision the court said the commission could do this "by the reduction of maximum amounts of gas contracted for or claimed" by Panhandle's customers.

Judges Albert W. Maris and Harry Kalodner concurred and Judge Joseph McLaughlin dissented in the decision.

The company purchases and produces natural gas in the Panhandle and Hugoton fields of Texas, Oklahoma, and Kansas. Panhandle also owns and operates a pipe-line system which extends through Oklahoma, Kansas, Missouri, Illinois, Indiana, and Ohio to points in Michigan.

Unanimous action . . . In a unanimous decision the judge turned down an appeal by Michigan Consolidated Gas Co. The latter had been refused permission by FPC to obtain additional natural gas from Panhandle.

"We see no merit in Michigan Consolidated's contention that the commission acted arbitrarily in refusing to allot it any portion of Panhandle's increased capacity while at the same time imposing upon it, by approving Panhandle's new 'rolled-in' rate, a large portion of the increased cost of that additional capacity," the court said.

The court also set aside an FPC order rejecting Panhandle's application to reduce deliveries to Michigan Consolidated.

Cities Service Prepares To Sell Utility Stocks

NEW YORK.—Cities Service Co. has agreed to sell its common stock of Republic Light, Heat & Power Co., Inc., and Penn-York Natural Gas Corp. to National Fuel Gas Co. The latter owns all outstanding stock of Iroquois Gas Corp., Buffalo, N. Y.

The sale, which must first be approved by state and federal regulatory agencies, will be for approximately $5,500,000.

Cities Service is taking steps to dispose of its remaining utility properties in order to be exempt from the Public Utility Holding Company Act of 1935.

Republic, a gas-distribution company, serves 61,000 customers. A natural-gas production and transmission system from northern Pennsylvania to points on the Republic system is operated by Penn-York.

Gas Forecast

Annual output by 1975 of 15 trillion cubic feet seen

NORMAN, Okla.—A prediction that natural-gas production of the United States will reach 15 trillion cubic feet per year by 1975 was voiced here recently by Thomas F. Cartwright, president of Amarillo Oil Co., Amarillo, Tex. Annual marketed natural-gas production in 1952 was 8,004,800,000 M.c.f., according to preliminary reports of U. S. Bureau of Mines.

In the keynote address before the twenty-eighth Southwestern Gas Measurement Short Course, Cartwright reviewed the magnitude of the postwar expansion in natural-gas production and distribution facilities, comprising $9,500,000,000, to be completed by 1956.

However, he pointed to the continued rapid growth beyond 1956 and said that "only future exploration can definitely outline supplies of the industry's raw material, but the potential has been estimated at 500 trillion cubic feet."

Gas payroll soars . . . Cartwright described how the natural-gas industry's payroll nearly doubled during the past 6 years. Currently, the payroll approximates 500 million dollars a year, compared to about 280 million dollars in 1947.

The number of employes in the gas industry has risen from 98,500 in 1947 to 129,000. Average annual wages per worker for the industry are up from $2,840 in 1947 to $3,840 last year, he said.

The course is sponsored by the College of Engineering of the University of Oklahoma, assisted by eight state and industry organizations.

About 100 specialists from the industry itself acted as instructors in a series of 1-hour lecture classes in equipment and methods for control of gas pressure, regulation, and measurement.

Pat H. Miller, Texas Eastern Transmission Corp., Shreveport, chairman of the program committee, was named general chairman for the 1954 short course succeeding T. S. Whitis, West Texas Gas Co., Lubbock, Tex.

W. H. Carson, dean of the college of engineering of the University of Oklahoma, was chairman of the executive committee.

Hope Seeks Authority for Natural-Gas Storage Pool

WASHINGTON. — Federal Power Commission authority to develop an underground natural-gas storage pool in Lewis and Harrison counties, West Virginia, is sought by Hope Natural Gas Co., Clarksburg.

The project, to cost about $1,236,000, would have a capacity of 20 billion cubic feet of natural gas and would be called Kennedy Storage Area. In the past the pool has been used by Hope for production of gas.

Hope wants permission to build about 15 miles of gathering lines and a new 3.73-mile, 12¾-in. transmission line. Forty-six of the field's existing wells would be reconditioned and 15 abandoned wells would be redrilled.

New Furnace Black Produced

BARTLESVILLE, Okla. — Phillips Chemical Co. has started commercial production of Philblack I, a new intermediate super abrasion furnace black at its Borger, Tex., plant. Philblack I is designed to give passenger-car tire treads increased mileage under severe conditions.

Natural Gasoline

C.N.G.A. to Make Annual Distinguished-Service Award

LOS ANGELES. — The California Natural Gasoline Association has revealed that it is setting up an award which will be made annually in recognition of distinguished service in the advancement of the C.N.G.A.

Warren H. Kraft, C.N.G.A. president, said the first such award will be presented at the association's annual fall meeting in October.

It is intended that the award will recognize outstanding work of younger men and stimulate their interest in the continuance of association activities. Organizational work, committee service, and leadership will be considered in selecting the recipient, who must be 42 years old or younger, Kraft said.

It is not a prerequisite that the recipient be a scientist, he said.

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PIPE LINES

Huge Gas Program

Three-firm, $100,000,000 expansion approved by FPC

WASHINGTON.—The Federal Power Commission has approved a huge integrated pipe-line construction program involving installation by three pipe-line companies of natural-gas-transmission facilities estimated to cost in excess of $100,000,000.

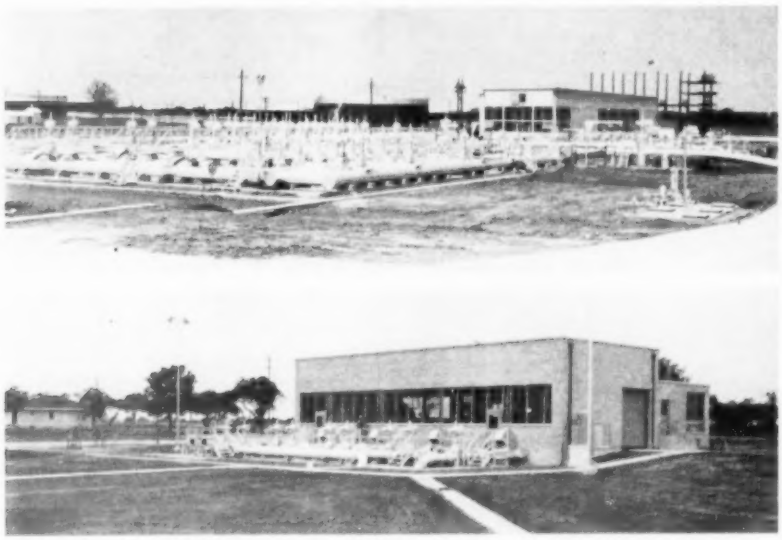
The commission approved construction plans of Northern Natural Gas Co., Permian Basin Pipeline Co., and El Paso Natural Gas Co., on condition that they submit further data.

Under the program, Permian will lay a 163-mile, 14-in. to 30-in. line, which will carry 300,000,000 cu. ft. of gas daily from New Mexico and West Texas fields to a connection in Yoakum County, Texas, with El Paso Natural's 24-in. transmission line to Dumas, Tex., 203 miles to the north in the Texas Panhandle. The Permian facilities would cost an estimated $42,530,000 and are tentatively scheduled for completion by December 1. The company would spend $38,135,000 on construction this year and the remaining $4,395,000 to complete plant and station facilities next year.

El Paso, which would spend $2,900,000 for compressing, measuring, and regulating facilities under the FPC authorization, would lease its line to Permian for 35 years. It would deliver the gas to Northern at Dumas for Permian's account, receiving 2 cents per M.c.f. of delivered gas for its services and the use of its facilities.

By using El Paso's 24-in. line to Dumas, Permian expects to cut costs of its construction by more than $15,000,000. Otherwise, the firm would be required to lay a 245-mile, 30-in. line to Dumas.

Northern program . . . New construction and expansion of existing facilities by Northern Natural to receive the gas is estimated by the company to cost a whopping $56,000,000—$33,-



Modern New Pipe-Line Pump Stations

At top is a view of one of the new pump stations on the West Texas Gulf Pipe Line Co. system, taken by The Oil and Gas Journal's photographer. The new $42,000,000, 577-mile, 26-in. pipe line runs from Colorado City, Tex., via Wortham, to Nederland, Tex. There is a 112-mile spur from Wortham to Longview. West Texas Gulf is owned by Gulf Refining, Sohio Pipe Line, Sun Oil, Pure Transportation, and Cities Service pipe-line companies. A feature engineering article on West Texas Gulf's new pipe line, by Paul Reed, pipe line editor, appears in this issue. Below is a view taken by the Journal's photographer of Rancho Pipe Line Co.'s Garfield pump station. This new 457-mile 24-in. crude-oil pipe line was recently placed in service from McCamey in West Texas to junction points in the Houston area. Rancho has seven companies as participants; the line was designed and constructed and will be operated by Shell Pipe Line Corp. The new Rancho big-inch system was described in the news section of the Journal's April 20 issue, pages 106-107, and two engineering articles describing the Rancho construction and pump stations, by Paul Reed, appeared on pages 154-157, same issue.

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273,000 during the first year, the remainder the following year.

Northern Natural's authorization covers only main-line facilities sought by that company in its expansion program. The certificate is conditioned to prohibit use of the facilities to be constructed in the first year until the commission authorizes it.

The commission noted that its authorization did not deal with such issues as the disposition of the additional gas Northern will get and that these would be heard and decided subsequently.

Roy F. Parkhill Sells Pipe-Line Stringing Firm

TULSA.—Roy F. Parkhill has sold Parkhill Truck Co., pipe-line stringing company, to three men who are now the sole owners.

They are Kenneth A. Owen, who now heads the company as president; Trap Briscoe, vice president and general manager; and Howard S. Lipp, vice president.

Owen is leaving Comstock Midwestern, Ltd., in Canada to join the Parkhill organization May 15. Briscoe has recently served as secretary-treasurer of the Parkhill company. Lipp has been vice president of Midwestern Constructors, Inc.

Parkhill will retain his Canadian firm, Canadian Parkhill Pipe Stringing, Ltd., which has a contract for handling pipe for the Trans Mountain Oil Pipe Line Co. project.

Equipment taken over by the new management consists of 200 vehicles. Parkhill Truck Co. will continue to operate from headquarters at Tulsa.

Sour Lake Line Finished

BARTLESVILLE, Okla.—Cities Service Pipe Line Co. has announced its 20-in. oil pipe line from its Sour Lake, Tex., tank farm to Lake Charles, La., has been placed into operation.

Associated Pipe Line Contractors, Inc., finished laying the line in late April. At present, it is pumping more than 130,000 bbl. daily to the Lake Charles refinery.

The system was completed in record time, despite unseasonal rains.

Line to Begin Operating

LINDEN, N. J.—Buckeye Pipe Line Co.'s 16-in. reversible products pipe line between Linden and Allentown, Pa., is expected to be placed in operation later this month, the company said last week.

The line is the first section of a system which will be extended through

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Scranton, Pa., and Binghamton, Auburn, Syracuse, and Caledonia, N. Y. Contracts for construction of these sections already have been let and work is under way *(The Oil and Gas Journal, March 30, page 75)*. Completion is scheduled for mid-September.

The line will move products from the Linden area and eventually will be connected with a Harbor Pipeline Co. line from Philadelphia-area refineries.

Standard of Indiana Starts Detroit Line

Standard Oil Co. (Ind.) has let contract for 100 miles of 12-in. line to Somerville Construction Co. as the first step in laying the 243-mile, 10 and 12-in. system to be built this year from Whiting, Ind., to River Rouge near Detroit.

Work is now under way on the Somerville contract. The remainder of the pipe laying will be contracted late this month for construction to start in June.

Construction on Salt Lake System to Begin in June

SALT LAKE CITY.—Construction on the 135-mile products pipe line between Pasco and Spokane is to be started late in June and completed by about October 1, Salt Lake Pipe Line Co. announced. The $4,000,000 project represents an extension of the company's existing line from Salt Lake City to Pasco.

There will be only one pump station on the line, located at Pasco. It will consist of three motor-driven centrifugal pumps with a total of 700 hp. With this one station capacity will be 15,000 bbl. daily. The line will carry two grades of gasoline and several grades of heating oil.

Arkansas Louisiana Plans New Compressor Station

WASHINGTON.—Arkansas Louisiana Gas Co., Shreveport, has been issued a Federal Power Commission certificate to construct and operate a 7,500-hp. natural-gas compressor station in Clark County, Arkansas.

Estimated cost of the station is $1,900,000. It will increase the capacity of Arkansas Louisiana's system by 40,000,000 cu. ft. daily. Temporary authority was granted last November 10.

A proposal by the company to build 6 miles of 12¾-in. lateral line to provide additional natural gas to the Lake Catherine steam electric-generating station of Arkansas Power & Light Co., Pine Bluff, was denied.

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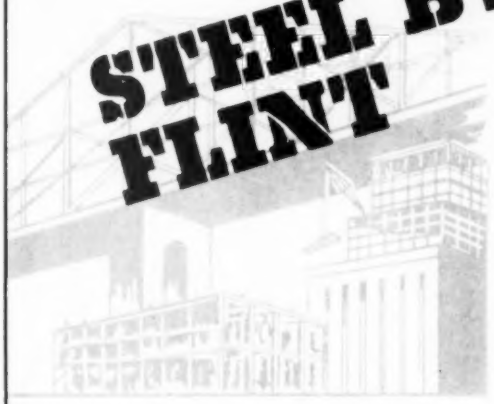

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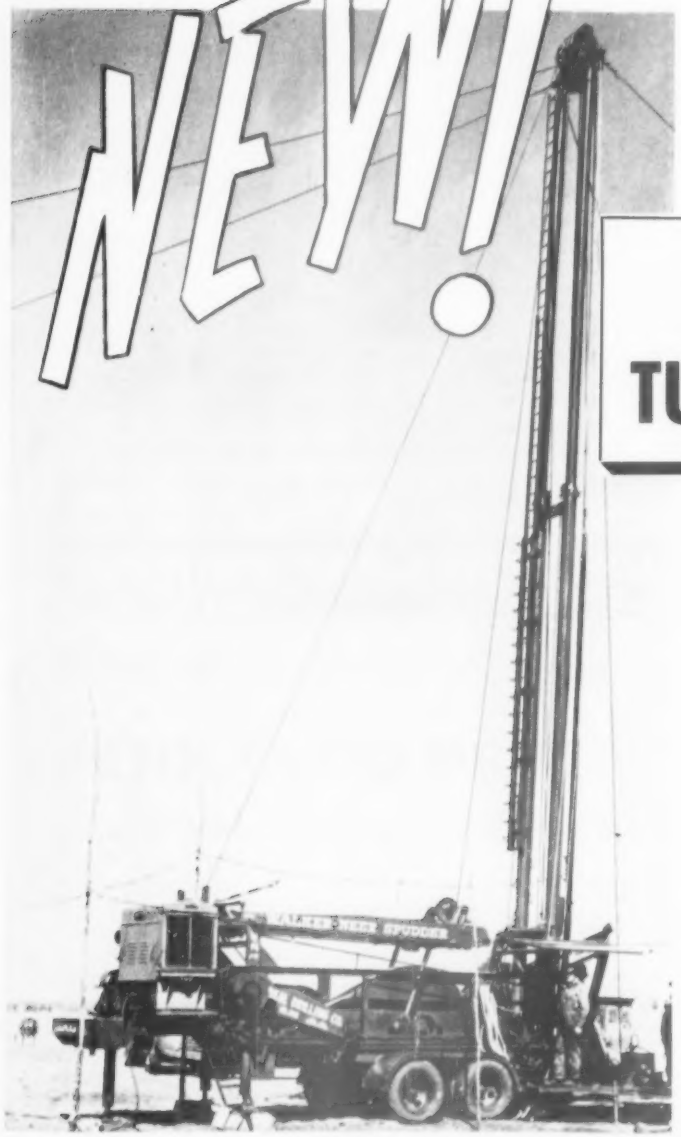

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EXPLORATION

Denver Basin's Opportunities Expand

by Philip C. Ingalls

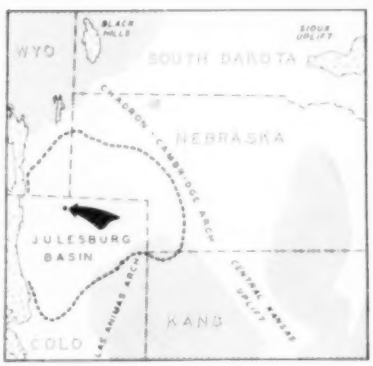
THE completion of a Permian-sand oil well in the Denver - Julesburg basin has accelerated interest in the ultimate future of this most active Rocky Mountain area.

Sherrod & Apperson 8 Gillette, NW NW 9-9n-61e, northeastern Weld County, Colorado, has been completed in the Permian-Lyons sandstone from perforations at 8,466-90 ft. On the first 2 days of pumping tests the discovery well averaged more than 250 bbl. of water-free oil daily. This deeper-pool test in Keota field topped the Permian (or possibly Triassic) at 7,847 ft., the Pennsylvanian at 9,258 ft., and was bottomed in the lower Missouri or upper Des Moines at 9,665 ft. Oil shows were logged in the Permian-"Big Blue" between 9,036 and 9,134 ft., but none were of commercial caliber.

This is the first Denver-Julesburg-basin well to be completed as a producer from per-Cretaceous rocks and as such has stimulated thinking about the basin's deeper opportunities. Deeper-drilling activity has already started as a result of the Sherrod & Apperson discovery which was indicated several weeks ago by a drill-stem test.

Apparently the Lyons sandstone is very extensive. It outcrops along the Front Range forming hogbacks and is characterized in the type locality near Boulder, Colo., by conspicuous cross-bedding. In the area of the Sierra Grande-Apishapa arch in southeastern Colorado, where it is believed to have its maximum subsurface development, the Lyons sandstone is normally clean. Here thicknesses of more than 300 ft. have been found in wells and the sand's grain size is the coarsest known. Indications are that the Lyons is a beach sand that developed around the southern uplift and northward along the Front Range, becoming finer grained and including more and more shale in its eastward equivalents in Kansas and Nebraska.

The increase in the percentage of clastics in Permian and Pennsylvanian rocks as the Front Range is approached from Kansas has been well demonstrated by John Maher (U.S.G.S.) in his work in southwestern Kansas and southeastern Colorado. This change in facies also can be expected in the Denver - Julesburg basin resulting in a wealth of porosity in pre-Cretaceous rocks. Unless the action of fresh water entering at the outcrop areas has been effective in flushing potential traps, there should be some deep objectives well worth digging for.



Regional setting of the Denver-Julesburg basin in relation to the area of no Mississippian rocks in the subsurface (unshaded). Arrow points to Permian discovery.

As pointed out by E. C. Reed (Nebraska Geological Survey) at the Casper meeting of geologists last month, any discussion of the deeper possibilities of the Denver-Julesburg basin is not hampered by facts. Very little is known of the pre-Cretaceous rocks in the basin, but according to Reed (after whose work the accompanying sketch map was fashioned), a northeast-southwest-trending area of no pre-Pennsylvanian rocks may cut across the Denver-Julesburg basin. The fact that the Mississippian rocks to the north of this no-Mississippian area are lithologically and paleontologically different from those to the south may indicate that the basin probably began to form in Pennsylvanian time and then continued to become more of a basin throughout Permian time.

The fact that there are no pre-Pennsylvanian rocks overlying the basement in the Denver-Julesburg basin should not be considered as making the area any less attractive through the Pennsylvanian. Down along the Central Kansas uplift there are no Mississippian rocks. Pennsylvanian rocks are found directly on granite. Oil is produced from these rocks and, in a few places, from the underlying basement rocks. Some geologists operate on the idea that most of the oil found in Central Kansas originated in Pennsylvanian rocks because all other rocks were subjected to such long periods of erosion that any oil they once may have contained would have been lost.

Until proved otherwise, the Permian and Pennsylvanian sections of the Denver-Julesburg basin must be considered as including rocks that have reservoired oil.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

MONTANA . . . Shell Oil Co. has taken 10 additional drill-stem tests throughout the Silurian and Ordovician to assure a total of five pay zones at 22-33 Unit, NW SE NW 33-10n-58e, Cabin Creek, Fallon County. Previous tests had established pays in the Charles, Mission Canyon, and Lodgepole.

COLORADO . . . Frontier Refining Co. reported an estimated flow of 7 to 10 million cubic feet of gas per day from 1 Unit, C NW NW 31-8s-104w, Mesa County. The wildcat is the second apparent discovery on the Bar-X Unit, which includes lands in Mesa and Garfield counties, and in Grand County, Utah.

WEST TEXAS . . . Tentative top of the Devonian at 12,545 ft. in Sharples Oil Corp. 1-A Means, gives the well a favorable position, structurally, correlated with Magutex field to the west. Continental Oil Co. 1 McCollom, Andrews County wildcat, found 276 ft. of Wolfcamp pay section.

Anadarko Basin Most Active Rank Wildcat Area in the Mid-Continent Region

by John C. McCaslin

THE Anadarko basin and its northerly extension, the Hugoton embayment, are currently the most active rank wildcat areas in the Mid-Continent region.

Since the first of the year 12 new oil and gas pools have been opened in southwestern Kansas counties. In Oklahoma's Panhandle counties operators have completed six new oil and gas discoveries so far this year. In the Kansas portion of the Anadarko basin, the most active counties are Meade, Clark, Morton, Finney, Comanche, Ford, Hodgeman, Thomas, and Sheridan. Beaver and Cimarron counties are northeastern Oklahoma's most active areas.

Oklahoma Panhandle success . . . Oil production was opened in Oklahoma's Beaver County at Beaver - Panhandle pool toward the end of 1951 in the Pennsylvanian. The discovery well was later abandoned, after production declined to noncommercial volume and two dry offsets had been drilled. However, this short-lived discovery stimulated interest in the county which has had nine new producing areas since the first production was opened.

Map of Anadarko basin producing area. Stars indicats 1953 discoveries.

Early this year Carter Oil Co. opened a new pool in Beaver County at South Greenough, in the Chester and Morrow formations. South Greenough pool is southeast of the nearest Morrow (Pennsylvanian) production in Light gas - distillate field, Seward County, Kansas. An Oswego (Pennsylvanian) oil discovery was completed 1 mile southeast of Light field also early this year. Recently, Southeast Glenwood, another new gas field for Beaver County, was opened in the northeastern part of the county in the Chester lime. Aladdin Petroleum Co. opened another Morrow producing area 1½ miles south of the Southeast Liberal area of Kansas, and Carter has a new Morrow gas discovery 1 mile south of Forgan in Beaver County, just 1 mile north of abandoned Beaver-Panhandle pool.

The opening of North Sturgis pool in Cimarron County, Oklahoma, this year revived activity in that far northwestern Oklahoma county. Coltexo Corp. had an open-flow capacity, calculated on the basis of a 1-hour test, at 33,576 M.c.f. of gas per day from the upper Morrow at its 1 Purdy. The new pool is 5 miles northeast of the Keyes gas district, and 15 miles west of nearest Hugoton field production. A new Keyes sand gas discovery was made southeast of North Sturgis pool in March by Cities Service Oil Co. It rated 5,200 M.c.f. of gas per day.

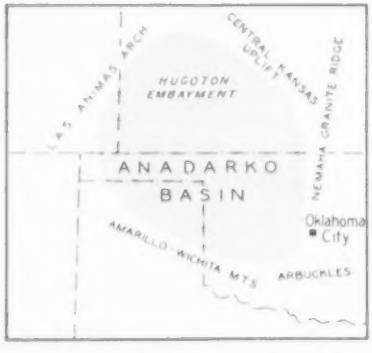
Southwest Kansas success . . . The most recent significant discovery in Kansas was made in Hodgeman County, 14 miles east of Purdyville pool, one of the county's two small producing areas. Atlantic Refining Co. recovered oil

General Geology of Tristate Anadarko Basin

THE Anadarko basin covers an area of about 35,000 sq. miles in western Oklahoma, the north part of the Texas Panhandle, and southwestern Kansas. The basin is bounded on the west by the Las Animas arch; on the south by the Wichita Mountains of Oklahoma, and their northwest extension, the buried Amarillo Mountains of the Texas Panhandle; on the north by the Central Kansas uplift; and on the east by the buried Nemaha granite ridge and the Arbuckle Mountains. The Hugoton embayment, northerly extension of the Anadarko basin, includes the area between the Las Animas arch in eastern Colorado, Central Kansas uplift north of the Oklahoma line.

Most of the sedimentary rocks in the Anadarko basin are of Paleozoic age, ranging from Cambrian through Permian. Rocks producing oil in or near the Anadarko basin are: the Arbuckle, Simpson, Hunton, Springer, Des Moines, Missouri, and Permian. Mississippian rocks are not at present important oil-producing formations. Future drilling in the basin is expected to reveal commercial reservoirs, however, particularly where Mississippian rocks have been truncated and covered by Pennsylvanian sediments to form stratigraphic traps.

Leading oil fields in the Anadarko basin are: Elk City, Ringwood, Apache, and Cement (the basin's oldest pool), all in Oklahoma; the Panhandle oil and gas fields of Texas; and the vast Hugoton gas field of Kansas and the Oklahoma Panhandle.



Map of the Anadarko basin and its limiting regional features.

from two zones in the Marmaton (Pennsylvanian) at its 1 Hall in a sparsely productive region of the northern end of the Anadarko basin northeast of Dodge City and is completing.

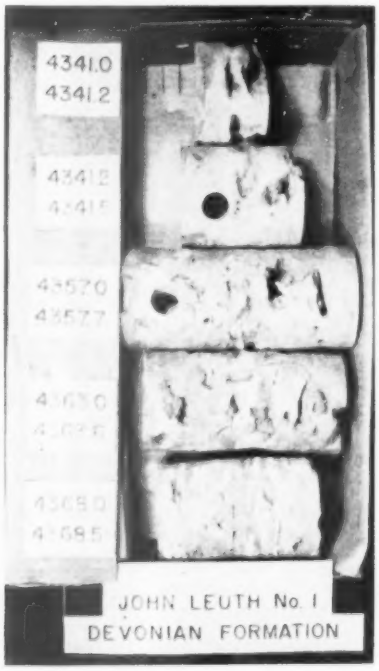
Drilling activity in far southwestern Kansas this year has centered around Greenwood gas field in Morton County, west of Hugoton gas field. There are 10 tests under way in the pool which was opened about 2½ years ago. Cities Service recently completed seven gas wells in the field to further prove the importance of the new gas-producing area. In less than 2 years the pool has expanded to cover most of Township 33, Ranges 42 and 43. These seven new wells have a combined open-flow deliverability of more than 175 million cubic feet of gas per day from the Topeka (Pennsylvanian) at near 3,000 ft.

Greenwood field is Kansas' westernmost producing area. The field produces from the Morrow, Topeka, and Lansing (all Pennsylvanian). The field is located about 70 miles north of the Oklahoma Panhandle's new North Sturgis gas area in Cimarron County, opened this year with Morrow production. Pay in the Hugoton gas area to the east is from the Chase group of Permian age.

Cities Service has staked an important new test 6½ miles southwest of Greenwood near the Colorado line. Another wildcat is being drilled on the west flank of the Hugoton gas area in an important test area of southeastern Hamilton County.

The East Kismet area of Meade County, Kansas, directly north of Beaver County, Oklahoma, fields, has a new Morrow sand discovery. Important wildcats are under way in widely scattered rank wildcats in the area;

Williston Devonian Cores



These cores illustrate the vuggy and cavernous character typical of many of the porous zones present in the upper Devonian strata of the Williston basin. They were cut with a diamond core head at depths of 4,341-69 ft. in Continental Oil Co. 1 Leuth, Wells County, North Dakota. They are from the Cooking Lake member of the Woodbend formation of Devonian age.

The rock is a light brown, fine to medium crystalline dolomite containing numerous irregular shaped vugs ranging up to 1-in. in diameter. Many of the vugs are partially filled with crystalline anhydrite.

Both plug and full diameter analyses were made by Continental's core laboratories in Ponca City, Okla. Plug analysis porosity ranged from 2.9 to 19.2 per cent; full diameter analysis porosity ranged from 13.4 to 28.5 per cent. Computations of porosity from the resistivity curves opposite these zones resulted in a variation of from 15 to 24 per cent.

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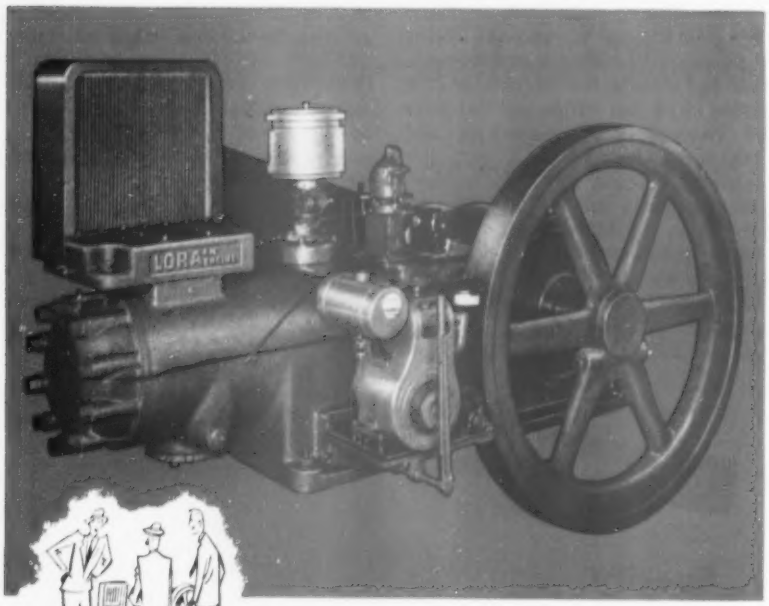

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WHITE-ROTH Machine Corp. LORAIN, OHIO

in Clark, Finney, Gray, Logan, Meade, and Morton counties. The most recent indicated discovery in the Meade County area is at Columbian Fuel Corp. 1 Meyer, possible deep Morrow sand oil discovery. The strike is located 3 miles west of Novinger pool, and 2½ miles east of Seaward County's Kismet pool.

Texas Panhandle . . . A deep wildcat test has been staked off the east flank of Hugoton gas field in Hansford County, Texas, in the northern portion of the Panhandle. The new wildcat will be of considerable importance to exploratory work along the flanks of the Hugoton gas area where most success has been in the Oklahoma Panhandle and southwestern Kansas.

Development in Roberts County's comparatively new Quinduno field, the Texas Panhandle's most active development area, continues to be outstanding.

LOUISIANA

SOUTH LOUISIANA

Weeks Island Deep Pay Gets Second Producer

Confirmation of the 17,100-ft. production recently opened by Shell Oil Co. at its 1 Weeks-Gall, world's deepest producer, on the north flank of the Weeks Island Dome, in Iberia Parish, has been given with the completion the past week of a good well in tht horizon by Humble Oil & Refining Co. at its 1 Gonsoulin, located a half mile east of Shell's discovery producer.

Producing interval of the Humble well, in which casing is perforated at 17,080-113 ft., is slightly higher than that of Shell's well, making the new well the world's second deepest producer. Production of Shell's well is from an interval at 17,083-122 ft. in open hole, bottomed at 17,183 ft. Total depth of the Humble well is 17,403 ft., 220 ft. below that of Shell's well, but hole is cased to bottom.

Completion gage of the Humble well was 192 bbl. of 44.6°-gravity oil with 4,777,000 cu. ft. of gas in 24 hours, flowing through ¾-in. choke on the tubing. Flowing pressure on the tubing was 5,400 psi. With the well shut in, pressure built up to 6,050 psi. Shell's well flowed 298 bbl. of 39.5°-gravity oil with 8,442,000 cu. ft. of gas in 24 hours through 17/64-in. choke at completion and had a tubing pressure of 5,275 psi.

Development of the deep producing horizon is continuing with Shell starting another well, its 2 Gonsoulin Minvielle-State Unit, at a location ½ mile northeast of its 1 Weeks-Gall Unit and about the same distance northwest of the new Humble well. The new test, located farther out and down-dip from the dome, where production is expected at a greater depth, is projected to 18,000 ft.

Rapides Wildcat to Pump

Midstates Oil Corp. and J. R. Butler of Houston are completing an indicated Wilcox oil-discovery well in western Rapides Parish. The well, 1 Heflands, Inc., located in 23-2n-4w, produced at the rate of 100 bbl. of net oil per day by swabbing. It failed to flow naturally, but is expected to make a good

producer on the pump, which is being set up for potential tests. Pay interval is open through casing perforations at 8,592-94 ft. Pipe was run to 8,800-ft. in hole drilled to 8,923 ft. Location is about 4 miles northwest of the Bliss field, which has 3 Wilcox wells.

NORTH LOUISIANA

New Pay at Clay

Southern Lincoln Parish's Clay field in north central Louisiana has a new pay, the "D" sand. Southwest Gas Producing Co., Inc., and W. C. Feazel Interests completed 1 Sherrard in Section 10-17n-3w, 5,350 ft. west of the field opener, a Travis Peak producer. The new pay discovery flowed 28.52 bbl. of 54°-gravity condensate and 3,344 M.c.f. of gas per day from the "D" sand of the Cotton Valley. Producing sand is exposed in open hole at 10,058-72 ft.

The strike was completed on gage of 26½ bbl. of oil per day through ½-in. choke from perforations at 4,014-30 ft. Gas volume was 1,000 M.c.f. daily. On drill-stem test of the Springer at 4,000-29 ft. recovery was 360 ft. of fluid of which 270 ft. was clean oil and 90 ft. was oil and gas-cut mud. Nearest production is North Gotebo pool which was opened about 1½ years ago with production from the Springer.

Cimarron Activity

Cities Service Oil Co. continues an intensive campaign in Oklahoma's northwesternmost county, west of the Hugoton gas area. The company's 1 Melton, SW SW NE 15-5n-9eCM, gaged 5,500 M.c.f. of gas from perforations at 4,516-36 ft. The test is about 2 miles southwest of the recent discovery at 1 Whisenand, NE NE SW Section 2, which was completed in April for an open flow of 6,400 M.c.f. of gas from the Keyes sand. Two other tests are drilling in the immediate area.

Near the Colorado line Coltexo Corp. has completed the west offset to new North Sturgis pool at 1-B Purdy, C NW SE 19-6n-9eCM. The well flowed 13,859 M.c.f. of gas per day from the Keyes sand. The same operator has three other tests drilling in the area.

Tests Delayed at Garfield Marshall Sand Discovery

Crews are pulling tubing to rework Toklan Production Co. 1 Blaser, Garfield County discovery in the SW SW NE 17-23n-4w.

Crews swabbed load and swabbed dry after

OKLAHOMA

Swabbing and Cleaning Continues at Ohio Strike

Ohio Oil Co. is continuing swabbing and cleaning out 1 Thomas Goodin, NE NW SW 34-9n-1e, discovery in northeastern Cleveland County.

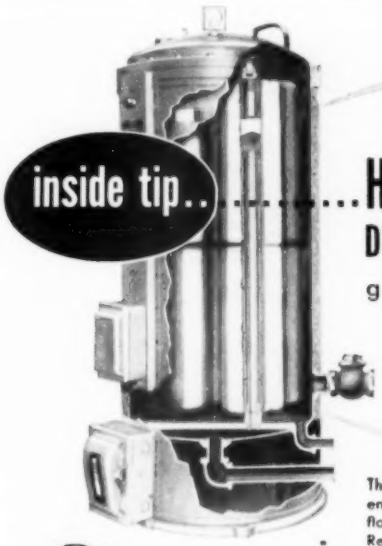
The well flowed 27.85 bbl. of oil in 30 minutes through casing and stopped. Swabbing recovered 167 bbl. of fluid, mostly oil,

Arrow indicates new deep North Freeny pool in McClain County, opened by Jay Simmons et al 1 Wilson, C SE SE 14-8n-4w, has a fast development program scheduled. Kenneth A. Ellison and C. B. Wrightsman have a Tulip Creek test started at 1 Harrison, C SE SW 14-8n-4w, Jay Simmons et al have a 11,000-ft. test offsetting the field's discovery well to the east at 1 Johnson, E½ W½ SW SW 13-8n-4w, and Simmons' 1 Kidwell, C NE NE 23-8n-4w, is a south offset test. The discovery well, Simmons 1 Wilson, has been flowing about 20 bbl. of oil per hour from Tulip Creek perforations at 10,447-88 ft.

for 20 hours. Casing is perforated at 6,301-09 ft. in the second Wilcox sand. The new discovery is located 1 mile east of Southeast Denver pool, a Bartlesville sand producer. The same company will drill 1 Mary Austin in SW SW NW 34-9n-1e.

New Kiowa Pool

A new discovery has been completed in the northeastern corner of Kiowa County, southwestern Oklahoma, at Huffman & Malloy and Zephyr Drilling Corp. 1 Heiple, NW SE NW 6-17n-15w.



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a fracture treatment of perforations at 6,108-15 ft. in the Marshall sand. Casing perforations were then found to be plugged. Before the fracturing the well gave up 7½ to 8 bbl. of oil per hour after a 500-gal. acid treatment. The new strike is located 2 miles south of Northeast Prairie Valley pool. W. C. McBride, Inc., and Portable Drilling Corp. are to perforate for production tests at 1 Mae McPherson, NE NE NE 7-23n-4w, off the southwest side of Northeast Prairie Valley pool. First Wilcox was topped at 6,142 ft., second Wilcox at 6,222 ft.

McLish Pay Tested At Coal County Prospect

Carter Oil Co. has a new indicated oil discovery in Coal County, lower east central Oklahoma, at 1 Morgan, SW NE SW 3-2n-9e, 4 miles north of Centrahoma pool.

A drill-stem test at 7,637-70 ft. recovered 55 ft. of oil and gas-cut mud, 50 ft. of free oil and no water. Crews are pulling a core taken at 7,689-7,714 ft. in the McLish dolomite.

This is the first significant development in Coal County since the opening of Northwest Tupelo field last year, a Bromide sand producer.

Garvin County Active

More production tests are due at Stanolind Oil & Gas Co.'s 1 McKey, Garvin County discovery well in SE NE NW 12-1n-3w. Perforations in McLish and basal Bromide sands have been tested. A drill-stem test at 9,908-96 ft. in the basal Bromide had gas at the rate of 1,700 M.c.f. per day. A dark colored distillate was recovered at the rate of 5 to 10 bbl. per hour. A drill-stem test of perforations at 10,087-93 ft. in the McLish flowed gas at 2,400 M.c.f. per day plus 15 bbl. oil distillate per hour.

At another wildcat in the area shows were found in cores at Stanolind 1 M. House "B," SE SE SE 2-1n-3w, ½ mile northwest of 1 McKay. The core was taken at 7,501-51 ft. Phillips Petroleum Co. is testing another discovery in C NW SE 2-3n-4w, 1½ miles northwest of Northeast Purdy pool in the western part of Garvin at 1 Anesen. The latest test at the discovery flowed 128 bbl. of oil per day on ¾-in. choke from the Hart and Springer. Perforations are at 8,650-68 ft., 8,710-38, and 9,676-9,758 ft.

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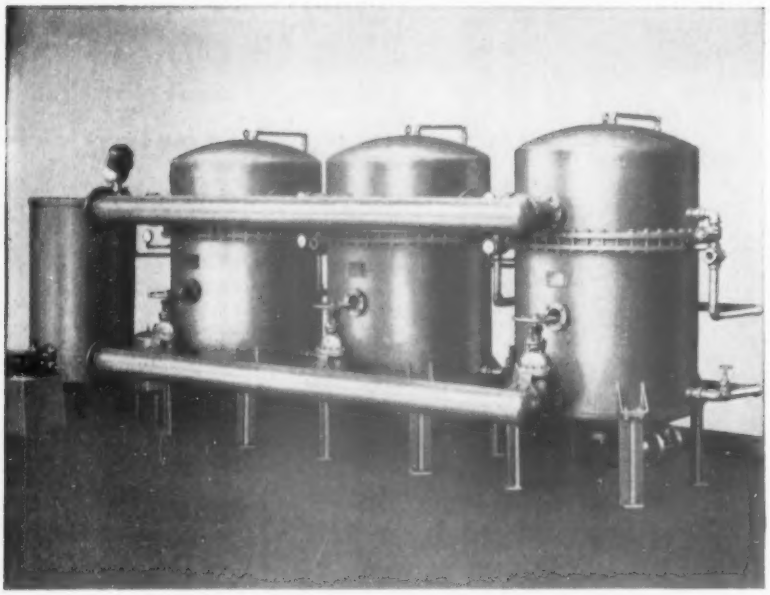

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TEXAS

WEST TEXAS

Middle-Ordovician Strike In Central Crane County

Gulf Oil Corp. 1 Lea in 40-32-PSL has established pre-Permian production southeast of the Sand Hills-Tubb field. A drill-stem test of the Simpson at 7,530-60 ft., had gas in 5 minutes and flowing oil in 15 minutes, which gaged 317 bbl. of 42° oil over the balance of the 8-hour test.

Location of the wildcat is 12 miles west of Crane, 2½ miles south of Devonian production in the Lea pool, and about 4½ miles southwest of Simpson production on the south end of Block 31 field. Original projected depth of the well was 9,000 ft.

In northeast Crane County, Gulf Oil Corp. 1 Gulf-Stanolind-State "EH" was drilling lime and chert at 10,661 ft. Location of the well, projected to the Ellenburger, is an outpost to Permian production in the Waddell-Dune-McElroy trend. The well has flowed oil from several sections in the Permian, including deeper pays than found in the trend field. A test at 6,544-83 ft. flowed 187 bbl. of oil in 11 hours, and at 6,583-6,620 ft. the well flowed 222 bbl. of oil in 17 hours. Top of the Devonian was 9,816 ft. on elevation of 2,500 ft. Tests from top of the Devonian down have developed gas-cut mud.

Andrews wildcat... Continental Oil Co. 1 F. T. McCullom, Ellenburger test 6 miles southeast of the town of Andrews, found a 276-ft. pay section in the Wolfcamp (lower Permian), while drilling through that formation.

Oil-cut mud was recovered at 8,696-8,716 ft., but flowing oil was reported on tests at 8,690-8,792 and 8,876-8,978 ft. The upper section gaged 26 bbl. of oil an hour, while the lower section tanked 16 bbl. an hour. A test at 8,792-8,876 ft. did not flow but recovered 4,922 ft. of clean oil with no water. Nearest Wolfcamp oil is 5 miles to the south.

Andrews development drilling... Humble Oil & Refining Co. 1-R State, north extension try to the Hutex-Devonian field, recovered 60 ft. of free oil in the Wolfcamp at 10,462-92 ft., and was drilling ahead.

The Texas Co. 1-AE State, on the southwest flank of the Northeast Andrews pool, checked 37 ft. low to the discovery, on the Devonian, but completed for a flowing potential of 1,161 bbl. of oil a day. Top of the Devonian was 12,529 ft. and pay section was perforated at 12,530-62 ft.

East of Magutex pool, Sharples Oil Corp. 1-A Means drilled shale to 12,545 ft., then went into hard rock, and operators were tentatively calling the top as Devonian. On that marker, the well would be some 100 ft. high to the Magutex discovery. This well is being watched with considerable interest. Fullerton Oil Co. stock, half-interest owners in the Sharples well and drilling block, was up

several points, on the basis of the well's indicated favorable structural position.

Ector County development... Texas Gulf Producing Co. 2 Headlee placed a tentative top on the Ellenburger at 13,000 ft., but hit a fault and reentered the Simpson around 13,025 ft. It drilled out into Ellenburger limestone again at 13,070 ft. Operators were coring ahead at 13,132 ft.

V. A. Brill and Associates 1-A David Fasken, northwest stepout to the Mac Boring field, had top of the Ellenburger at 13,508 ft. on elevation of 3,018 ft. Drill-stem tests to 13,573 ft. have recovered small amounts of oil, with no water.

Cities Production Co. 2-D Cross, offset to a recent discovery, flowed approximately 82 bbl. of oil during the last hours of a drill-stem test in San Andres limestone at 4,252-4,344 ft.

EAST TEXAS

Navarro Wildcat Has Oil Show in Pettit

Lawton Oil Corp. 1-A Neal, 4 miles south of Eureka in Navarro County, developed 300 ft. of oil and gas-cut mud on a 20-minute drill-stem test of Pettit limestone at 6,830-6,910 ft. Drilling continued below 6,918 ft.

Top of the Pettit was called at 6,815 ft., on derrick-floor elevation of 347 ft. Top on the Woodbine sand was 3,540 ft.

Gas discovery testing... Warren Petroleum Corp. 1 McFarland, southwest of the North Lansing gas field, Harrison County, made an open-flow test of 5,554,000 cu. ft. of gas a day. Production is from the Young zone at 6,993-98 ft.

Discovery completed... La Gloria Corp. 1 Frank Thomas, Harrison County gas-distillate find, completed for 4,393,000 cu. ft. of gas, plus 69.6 bbl. of condensate. The test was through 38-in. choke and pay was the Hill section of the lower Pettit at 6,401-09 ft.

TEXAS GULF COAST

New Gas Field in Jackson

A new gas field has been opened 4 miles southwest of Edna in Jackson County at D. M. Wallace 1-A P. K. Miller. The discovery gaged 28,000 M.c.f. of gas per day on open flow test. Production is from perforations at 5,469-73 ft.

Matagorda County Gets Promising Oil Discovery

An unusually promising oil discovery appears to have been made by Skelly Oil Co. 2 miles north of Van Vleck, in Matagorda County, where the company's 1 Savage, a wildcat located in the Maria Cummins Survey, filled 4,232 ft. of clean 33°-gravity oil in 20 minutes during a drill-stem test of a saturated sand interval at 8,475-85 ft.

The test was made through ¼-in. top and bottom chokes, showing maximum working pressure of 5½ psi. It flowed the 2,000-ft. water cushion, which was followed by the oil to the surface. In previous coring from 8,460 to 8,490 ft., approximately 20 ft. of saturated sand had been recovered. Unrecovered cores also may have been sand, but the bottom of the last core showed some water. No water was indicated on the drill-stem test.

The interval cored is believed to be in the upper part of the middle Frio section, and may correlate with the first Granbury sand which produces in the prolific Sugar Valley field, about 4 miles to the east.

The prospective pay is being passed up for the time being and hole probably will be carried to about 11,800 ft. for a look at lower potentially productive zones.

North Buna Area Expands

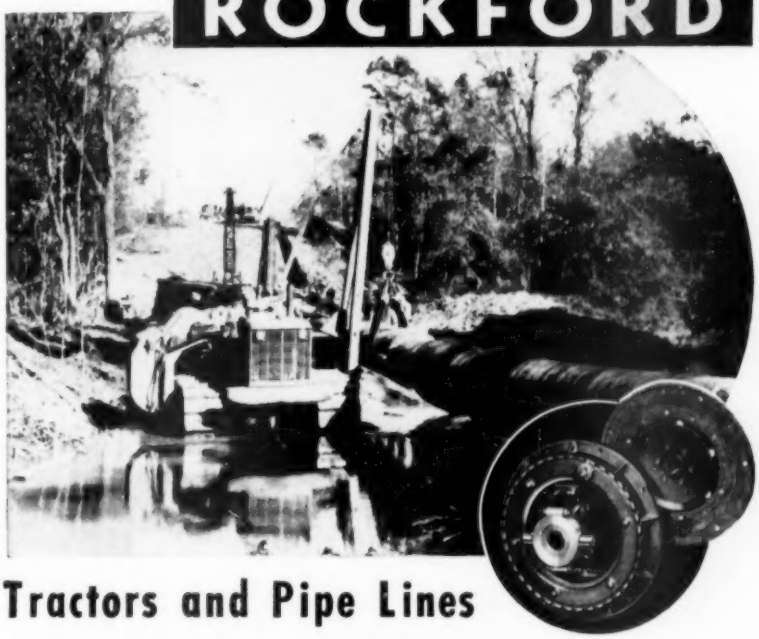
Ada Oil Co. and Hurt Oil Co., Ltd., have confirmed the Yegua production they opened last January at North Buna, in Jasper County. Their 2 Hardy Richardson, a location north of 1 Richardson, the discovery well, flowed 140.80 bbl. of 37.5°-gravity oil in 24 hours at completion. Pay is open through casing perforations at 7,213-18 ft. Producing interval of the discovery well is at 7,198-7,212 ft. Since the discovery, American Republics Corp. and Houston Oil Co. of Texas have completed another producer in a lower Yegua sand at 7,572-79 ft. at a location south of the discovery well.

Liberty Gas Discovery Is Potentialed

A new Liberty County gas discovery has been potentialed for 45,000 M.c.f. of gas daily from the Cook Mountain perforations at 11,247 to 11,249 ft. The new strike is General Crude Oil Co. 2 Mrs. Elizabeth Morris et al, located on a 791.29-acre lease in the Peter Mason Survey, Abstract 69, 2 miles southwest of Raywood and about 438 ft. west and south of the 1 Morris blowout well. The well also flowed some 53.3°-gravity condensate.

General Crude is moving east to drill 1

CLUTCHES by ROCKFORD



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First National Bank of Houston, Trustee for the Negro Hospital, on a 280-acre lease, Block 84, 1¼ miles southwest of Raywood. The 11,500-ft. confirmation test is in the same survey as the 2 Morris discovery, lying about 3,150 ft. east and south of the Morris well.

New Gas Pay Opened

A new shallow gas pay has been opened in the Trans-Tex area, 7 miles north of Louise, in western Wharton County, with the completion by Warren Petroleum Corp. of its 1 Stovall. The new well, which flowed 1,100,000 cu. ft. of dry gas per day through 13/64-in. choke from perforations at 3,026-29 ft., is a location east of Trans-Tex Transmission Co.'s oil-discovery well, 1 Socha, completed in a deeper pay at 4,545-48 ft. Warren's well was drilled to 5,125 ft. Testing now is under way at Trans-Tex Transmission Co. 1 Wallace, northeast offset to the oil-discovery well and northwest of the Warren gasser.

NORTH TEXAS

King and Cisco Sand Discoveries Promised

Nolan County had two prospective discoveries in the completion stage, one in Cisco sand and the other in the King sand.

Stanolind Oil & Gas Co. 1-E TXL, 8 miles north of Blackwell, treated the King sand through perforations at 4,081-84 and 4,088-96 ft., then swabbed 176 bbl. of load oil, 34 bbl. of sand-oil fluid and 160 bbl. of new oil, plus 35 bbl. of water, in 28 hours.

This well had promises of production in the Canyon reef at 4,620-50 ft., but was dry in the Ellenburger. Total depth was 6,532 ft., plugged back to 4,140 ft.

Jones & Stasney 1 G. W. Cochran, southeast of Maryneal, ran a 30-minute test in Cisco sand from 4,012-55 ft. Gas surfaced in 2 minutes and oil sprayed in 18 minutes. Recovery was 90 ft. of oil. A second test also sprayed oil and gas, but recovery was 15 ft. of oil and 120 ft. of oil-cut salt water.

J. D. Wrather 2 J. E. Davis, southeast offset to an Ellenburger discovery 3 miles northeast of Blackwell, swabbed 1 bbl. of oil an hour after treating the Ellenburger through perforations at 6,554-86 ft. with acid.

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CALIFORNIA

Richfield Makes Condensate Find at Wheeler Ridge

Formation tests at Richfield Oil Corp.'s northwest offset to the Eocene discovery well of a year ago indicated the extensioner would give Wheeler Ridge a third deep producing zone. The new pay is believed to be the Refugian sand of Oligocene age, overlying the deeper Eocene sand and about 3,000 ft. below lower Miocene production.

On a 1½-hour test at 9,584-9,660 ft., Richfield 74-29 K.C.L. flowed 51° condensate at a daily rate of 1,177 bbl. Gas production was at the rate of 12,040 M.c.f. daily. Flow was through a ⅛-in. bean.

The sand had been logged in previous Eocene producers but was not productive. These, however, were southeast of 74-29 K.C.L., in NW NE 29-11n-20w. Following the test the operator prepared to drill ahead below 9,960 ft. to check Eocene production potentialities.

Sunray Completing Glenn County Gas Discovery

After several days of testing it appeared Sunray Oil Corp.'s Glenn County wildcat, northern Sacramento Valley, would be completed for about a 3,500 M.c.f. gas discovery. The wildcat, 1 Estes in NW NW 19-19n-1w flowed at a steady 3,250 M.c.f. daily rate for 7 hours on a test through perforations at 3,653-65 ft. This flow was through a 44/64-in. bean; on a later test through a 29/64-in. choke a flow of 3,500 M.c.f. daily was recorded.

Buena Vista Antelope Pool Again Extended

Kern Oil Co., Ltd., 52 Unit A at Buena Vista Hills was completed as a ½-mile southeast extensioner to the Antelope fractured shale pool. Based on a 10-hour gage, it made a 408 bbl. producer through an 18/64-in. choke from about 1,000 ft. of perforations above 4,950 ft. Crude gravity was 31.3°.

The extensioner was one of the best producers yet completed since the deeper drilling program was started about a year ago. Although the fractured shale zone is somewhat spotty, the 24 wells completed to date are producing about 3,500 bbl. daily. A production trend about 7 miles long has been established by the 160-acre well spacing program being followed.

Merced County Activity

Shell Oil Co. shortly is expected to enter the revived Merced County oil search by staking a wildcat about 20 miles southwest

of Merced, reportedly in 10-10s-13e. Shell and Richfield Oil Corp., both of which have acquired sizable holdings in recent months, are expected to drill several tests in the region in coming months.

Site of the Shell test will be about 20 miles east of two recently started wildcats in the Los Banos area. In 36-10s-9e, E.A.S. & Associates 1 Gay was drilling below 2,850 ft., and in 23-9s-10e, Wm. R. Whittaker Co.'s test had reached a depth of about 1,000 ft.

KANSAS

Flowing McPherson Discovery Opens New Pool in Salina

A new flowing discovery in the extreme end of the Salina basin has been completed, opening Lively pool.

National Associated Petroleum Co. has completed 1 Lively, NE SE NE 28-19s-2w, with a flowing potential of 273 bbl. of oil daily from the Mississippi, giving McPherson County a new pool. Marion County has a new oil pool at Anderson-Prichard Oil Corp. 1 Scully "A," SE NW NW 34-18s-2e, opening Durham pool in the Viola.

The new discoveries are located in the southern part of the Salina basin, which covers an area of about 41,000 sq. miles of northeastern Kansas and southeastern Nebraska. The basin has no production except along its southern margin.

The Salina basin is separated from the Forest City basin of Iowa, northwestern Missouri, and northeastern Kansas, by the Nemaha granite ridge. O. O. Wallace and Fred Hewitt are moving in cable tools at 1 Edelman, NW NW NW 26-2s-14e, wildcat 1 mile northeast of Strahm pool in eastern Nemaha County, in the Forest City basin. A drill-stem test at 2,827-37 ft. recovered 30 ft. of heavily oil-cut mud and 30 ft. free oil in the Hunton. Successful completion of this indicated discovery would give the sparsely productive Forest City basin a new oil pool. The basin has six small producing areas at the present, most of them in the extreme southeastern corner of Nebraska.

Committee Names New Pools

The Nomenclature Committee of the Mid-Continent Oil and Gas Association has given names to 16 new oil and gas pools in 12 Kansas counties. A summary by counties and areas follows:

Southern Kansas . . . Barber and Cowley counties each has a new pool. Champlin Refining Co. opened Nurse pool at 1 Nurse, NE NE NE 23-31s-13w, flowing 4,035 M.c.f. of gas per day from the Douglas sand. Burden East pool was opened in Cowley by The Texas Co. 1 Jarvis, NW SW NW 33-31s-6e, in process of completion from the Layton sand.

Central Kansas uplift . . . At the northwestern end of the Central Kansas uplift Pollnow pool was opened by Anderson-Prichard Oil Corp. 1 Pollnow, NE NW SW 4-3s-29w, and is completing in the Lansing.

Turkville pool was opened in Ellis County by Derby Oil Co. 1 McComb, SE SE SW 11-11s-17w, in process of completion from the Arbuckle. Don Pratt opened Wheatland Northwest pool in Ellis at 1 Stecklein, SE SE SE 12-15s-18w, in the Arbuckle. Harry Gore opened White Southwest pool in Graham County at 1 Lewis, NW SE NE 35-10s-21w, in the Arbuckle. In Pratt County Moore Southwest is a new pool at Champlin 1 Hen-

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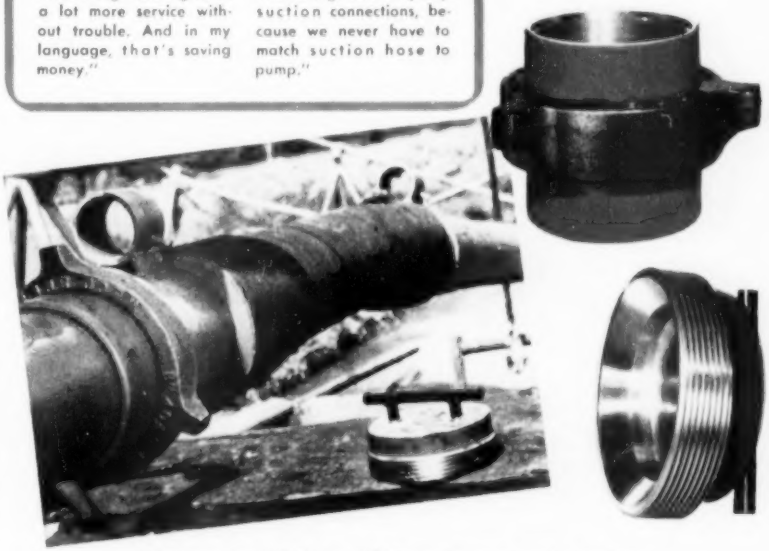

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derson, SW NE NW 11-26s-14w, completing in the Simpson. Rooks County has two new pools, Allphin and Ganoung. Continental Oil Co. opened Allphin at 1 Allphin, SW SW NW 33-10s-20w, for a pump potential of 497 bbl. per day from the Arbuckle, while Heathman & Co. 1 Ganoung, NE NE SE 31-9s-17w, was finaled in the conglomerate for 97 bbl. of oil per day on the pump. Two new pools for Stafford County are reported, Shepherd South and Cephas E. H. Adair 2 Sleeper, SW SE NW 21-22s-11w, is completing in the Arbuckle to open the first pool, and Helmerich & Payne 1 Toland, NE NE NE 10-25s-14w, is a new Viola pool, Cephas Kutina pool is Trego County's newest at W. E. Wickizer 1 Kutina, CNL NW NE 29-15s-21w, a tight hole.

Salina basin . . . The southern extremity of the Salina basin has four new pools. Durham pool in Marion County was opened by Anderson-Prichard 1 Scully "A," SE NW NW 34-18s-2e, for 202 bbl. of oil per day from the Viola. K. T. Wiedemann 1 Edmonds, SE SE NW 31-22s-4e, opens Edmonds pool in Marion County. National Associated 1 Lively, NE SE NE 28-19s-2w, is in process of completion from the Mississippi, to open Lively pool in McPherson County. National Associated also opened Salemsborg pool at 1 Olson, C NW SW 8-16s-3w, a new Viola pool in Salina County.

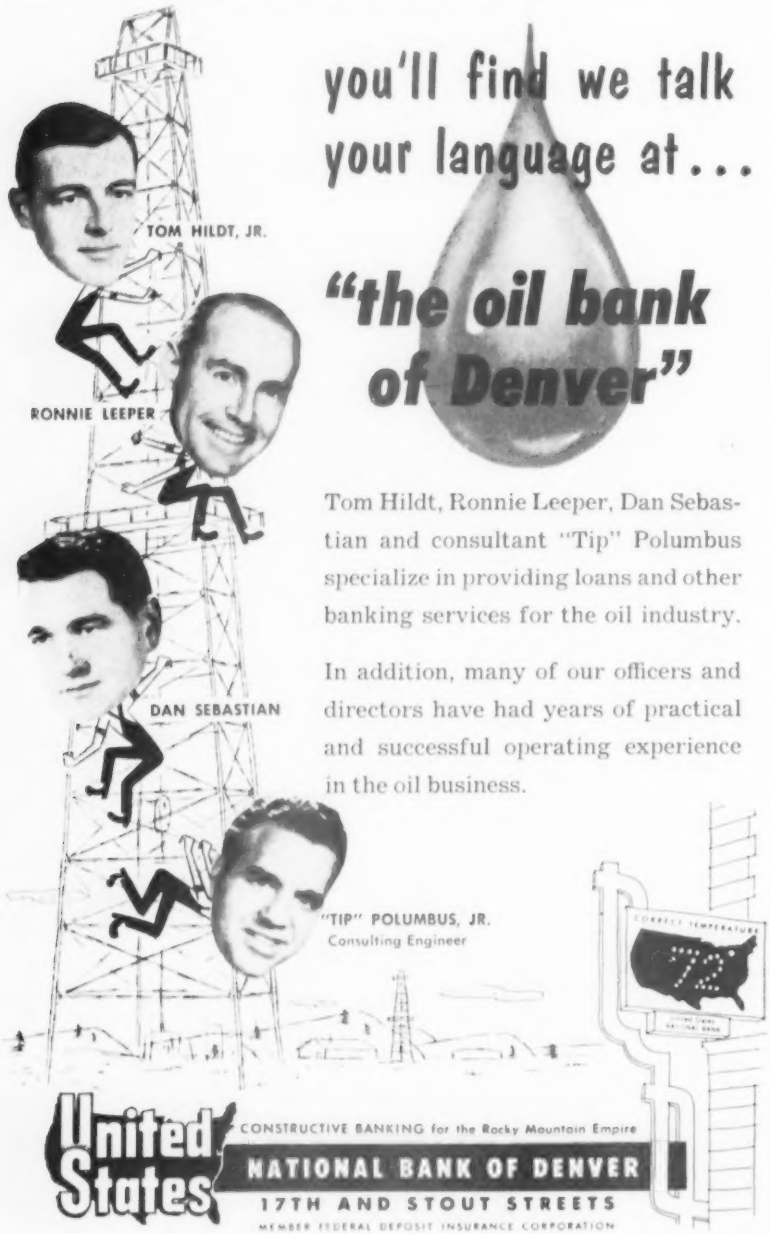
New Pool in Pawnee

Pawnee County, on the western flanks of the Central Kansas uplift, has a new pool at Westgate-Greenland Oil Co. 1 Koelsch, SE NE NW 33-22s-15s. The new pool is located 2 miles southwest of Dunes pool in the southeastern part of the county.

The operator is putting the well on pump after swabbing 110 bbl. of oil in 2 hours from the Lansing.

Barton County in the middle of the Central Kansas uplift has a new pool at Petroleum, Inc., 1 Essmiller "C," NW SW SW 13-19s-14w, wildcat 1 mile east of Alefs pool, and 2½ miles northwest of the city of Great Bend in central part of the county.

The operator swabbed 13 bbl. of oil per hour for 8 hours and is putting the discovery on the pump.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APPALACHIAN AREA

OHIO

Hanover pool will apparently have considerable gas along the west side if the Waverly Oil Works 1 Agnew Torpedo, Lot 10, Hanover Township, Licking County, is an indication. Clinton sand at 2,703-2,746 ft. made 2,300,000 cu. ft. of gas and a showing of oil, which will be produced natural for the present.

The wildcat Berea sand test on John Gooding, Lot 10, Clay Township, Tuscarawas County, came in as a small gasser. The sand was logged at 805-862 ft. with 175,000 cu. ft. natural.

The oil pay at East Sparta is now being developed by Beldon Producing Co. with two strings running. A completion on James Cijnzas, Section 24, Pike Township, Stark County, made 35 bbl. after Hydrafrac from Clinton at 4,835-4,890 ft.

MICHIGAN

Final Production Rating Made at Mason Strike

A final production rating was reported for Dow-Brazos-Taggart Bros. Gas Co. 1 Dow-Brazos Unit, SE NE NE 27-19n-18w, Hamlin township, Mason County, after acid treatment.

This important Niagaran oil discovery well which was included in the 1952 discoveries, was acidized with 2,000 gal. at 4,276-85 ft. Production was boosted from 40 to 60 bbl. of oil a day natural to an average during the past 7 days of 140 bbl. daily, with about 50 bbl. of water showing. The acid did not materially increase the water-cut.

This new west-state deeper horizon discovery was originally drilled by Dow Chemical Co. as a brine test well. The rework was done after two offsets, drilled to test for a basal Salina gas pay which showed on drill-stem test when well was originally being drilled, failed in both the basal Salina and Niagaran. The gas pay has not been opened during this rework, but well appears to be one of the most important deeper horizon wells drilled in Michigan. Same operators were ready to spud another Niagaran objective well at an offset to the 1 Dow-Brazos as April ran out. This next test will be at the 1 Hansen et al Unit, SW SE SE 22-19n-18w, the approximate north 40-acre offset to the discovery. This north well is being drilled on acreage farmed out from The Superior Oil Co. The first two failures in the area were at the approximate east and south offsets to the discovery well.

Another better-than-average Traverse oil producer appeared in prospect on the southwest side of Ravenna field, Muskegon County at Devine & Lang Co. 3 Nordwall, SW SW SW 30-9n-14w, Ravenna Township. Although tests had not been run, preliminary information indicated that this might be the best well completed to date in the pool. Structurally

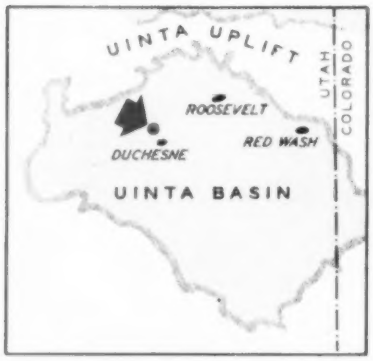
well was not the highest but one of the highest drilled in the area and hole filled rapidly when pay was tapped 1,840-43 ft. Production tests were delayed until both well and tank battery hook-ups could be revised.

ROCKY MOUNTAIN

UTAH

Upper Green River Discovery Reported in Uinta Basin

Carter Oil Co. tested oil at the rate of 177 bbl. per hour from upper Green River at 1 County, C SW NW 25-3s-5w (USM) Duchesne County, Utah, for the first apparently commercial recovery from the upper portion of the Green River in the area. The well is



Map showing outline of the Tertiary Uinta basin of Utah and producing areas. Arrow indicates new upper Green River discovery made by Carter Oil Co. at 1 Duchesne County, C SE NW 25-3s-5w (USM). The well flowed at the rate of 177 bbl. of oil per hour. The oil is 19° gravity with a pour point of 25°, contrasting with high gravity and considerably higher pour point for oil produced in the other fields of the basin. The discovery becomes the first commercial producer from the upper Green River in the Uinta basin.

northwest of Duchesne pool, and was a scheduled 9,000-ft. test to the basal Green River. Oil recovered was of low (19°) gravity, but had a pour point of approximately 25° in contrast with the usual 90°-100° pour point of previous production within this basin.

Test was run of the zone 5,126-5,225 ft. and will tool open 1 hour and 47 minutes. There was gas at the surface in 20 minutes, oil in 22 minutes. Flowing pressure was 860-1,960 psi., and shut in pressure after 45 minutes was 2,240 psi.

Carter is reported coring below 5,225 ft. and has not announced decision as to whether the well will be completed at about the present depth.

Rocky Mountain Maps

Sectionized production maps showing oil fields in green, gas fields in red with official field names. Sections, townships, ranges and county seats. Drilling wells and dry holes with total depths.

Williston Basin — Size, 42" x 48". Scale, 1" = 10 miles. Prices: Paper, $30.00; Linen, $37.50.

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North Dakota — Size, 52" x 74". Scale, 1" = 5 miles. Prices: Paper, $30.00; Linen, $37.50.

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COLORADO

Western Colorado Wildcat Is Dakota Gas Discovery

Frontier Refining has reported recovery of gas at an estimated rate of 7 to 10 million cu. ft. per day from the Dakota interval 2,838-80 ft. at 1 Unit, C NW NW 31-8s-104w, Mesa County, Colorado, in the eastern edge of the Uinta basin. The well went to a total depth of 3,550 ft. and plugged back after failure to find production in the Morrison-Entrada zones.

The Bar-X Unit is partially in Utah, partially in Colorado. A discovery in 1949 in 1 Crittenden, C SE SE 31-17s-25e, Grand County, Utah, by this operator produced gas from Morrison and Entrada.

New Permian Tests for Denver-Julesburg Basin

Interest in Permian prospects in the Denver-Julesburg basin area of Colorado has resulted in announcement of several new tests to this formation prior to completion of Sherrod & Apperson's 8 Gillette, C NW NW 9-9n-61w, Weld County, Colorado. The well, first to produce below Cretaceous in the basin filled up to within 2,000 ft. of the surface through perforations in Lyons sand at 8,476-96 ft., and pump is now being installed.

These operators have made location for a confirmation well at 9 Gillette, C NW SE 9-9n-61w, about ½ mile southeast of the discovery. Eisenhower Drilling is reported coring in Lyons at 7,900 ft. at 1 Niles, C SW SE 13-6n-61w, in the general Greasewood area. At this depth the operator was 7 ft. in Lyons, with no indication of shows below Cretaceous.

C. G. Glasscock and J. P. Sloss, independents have located a Permian test at 1 Bradbury, NE NE NW 15-9n-58w, Weld County, are drilling below 5,630 ft. Continental Oil Co. announced several days ago that it would deepen 1 Perry, C SW NW 13-9n-61w, a Cretaceous failure, to test Permian.

WYOMING

Gulf Abandons Fish In Big Horn County Wildcat

Gulf Oil Corp. has abandoned fish in 1 Emmett, C SW SW 13-52n-94w, Big Horn County, Wyoming, and will leave a core barrel and about 200 ft. of drill collars in the hole. Casing will be run in the wildcat to test Phosphoria and Greybull zones which logged shows during drilling. The Greybull sand, topped at 9,692 ft. unloaded high gravity green oil on drill-stem test and indicated commercial possibilities. Evaluation of Phosphoria shows has not been attempted, and will probably require acidization.

Stanolind To Drill Washakie County Unit

Stanolind Oil & Gas Co. has made location for the first test of the Cottonwood Creek Unit, embracing some 32,000 acres in Washakie County, southeast of Worland field.

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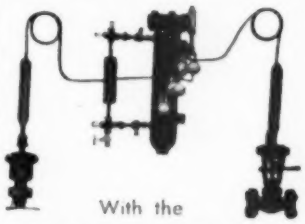

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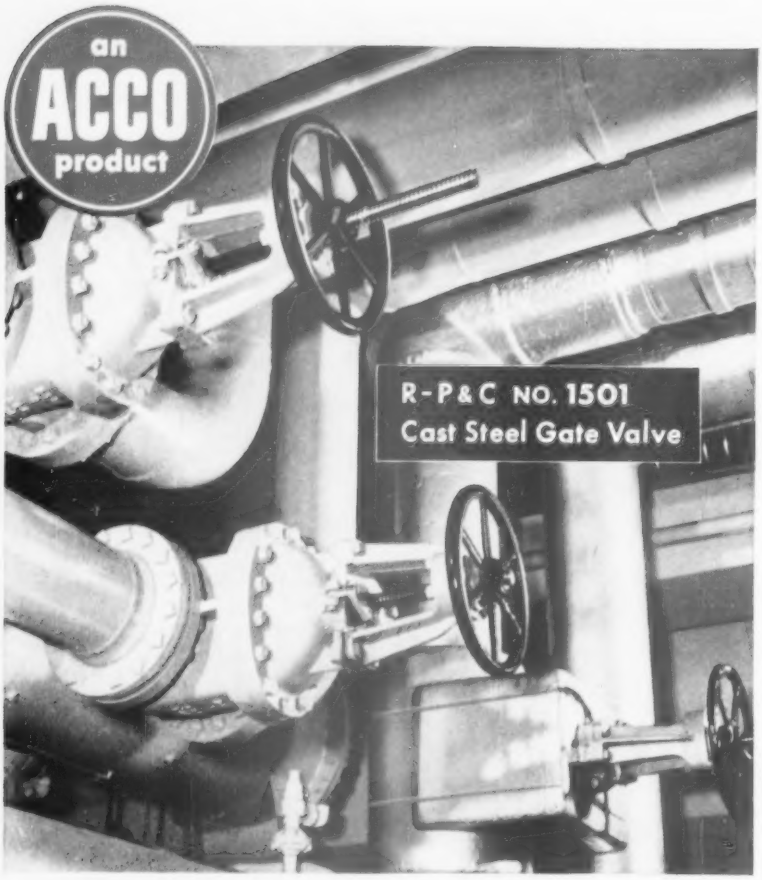

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The well will be located in C SW SW 2-47n-91w, and will test to Phosphoria at about 8,000 ft. This formation is productive in Worland field, and at South Frisby, to the southwest of the Stanolind unit.

NEBRASKA

Another West Sidney Gas Discovery Tested

Ohio Oil Co. has added another apparent discovery in the fast growing West Sidney gas area in Cheyenne County. The operator tested 1 Atkins, S½ SE NW 7-13n-50w, for a gage of slightly more than 2½ cu. ft. per day from "J" sand 4,784-94 ft. and for a gage of 4 million cu. ft. per day from "D" sand 4,615-25 ft. Smaller recoveries of gas were reported from zones above and below the two principal tests which mark the well as apparently commercial in both horizons. The well is about ¾ mile from production in the West Sidney area, and is located on a separate feature according to the operator. The area has had several gas discoveries during the past year but development has not been rapid in the vicinity of the recent discoveries.

MONTANA

Shell Oil Testing Silurian Ordovician at Cabin Creek

Shell Oil Co. has released drill-stem test data which confirms recent unofficial reports that the 22-33 Unit, NW SE NW 33-10n-58e, Fallon County had found production in Ordovician and/or Silurian. The tests indicate production for both these zones and when added to the apparently commercial shows found through Mississippian and Devonian bring to five the total of apparently commercial producing horizons in the well.

Test of the zone 8,377-8,439 ft. recovered 7,550 ft. of 31°-gravity gassy oil and 300 ft. of gassy oil mud, 15 per cent oil. Flowing pressure was 560-2,280 psi. Tool was open 2½ hours.

Best test below this depth was in the zone 8,897-8,973 ft. where recovery in 2½ hours was 4,440 ft. of 32.6°-gravity oil and 100 ft. of gassy, muddy oil with no water. Tests above and below these two zones made smaller quantities of oily mud ranging from 25 to 50 per cent oil. With total depth at 9,412, the operator is fishing, and has not announced whether the well will be deepened when fish is recovered.

Carter Setting Casing At Harding County Well

Carter Oil is setting casing to total depth of 8,393 ft. at 1 Hendricks, C SW NW 2-20n-3e, in the Gallup area of Harding County, South Dakota. Shows were logged in Ordovician above present depth, with recovery of 1 pint of free oil recorded.

Bronson Area Discovery Begins Tests Through Casing

Sun Oil Co. and Phillips Petroleum Co. have set casing at 1 Dynneson, C SW NE 32-24n-58e, north of the Cabin Creek discovery, and will test shows logged during drilling. The first test, considerably below the zone which made 2,700 ft. of free oil in 3 hours several days ago, recovered on gassy salt water and a gas-cut 4,500-ft. water cushion.

While the well is apparently commercial in

Ordovician near the present total depth of 12,671 ft. tests of the Mississippian section in the well have not been made. Geologists have been quoted as saying that shows logged in Mississippian are similar to, and as good or better as those in Beaver Lodge field, North Dakota, where acidization rendered good results.

CANADA

Three Key Wildcats Take Top Place in Area Activity

Three key exploratory wells were in the news in western Canada during the past 7 days, one in Alberta that had previously been chalked up as a wet gasser in the D3 Devonian zone—that entered an oil column during the week, and two natural gas discoveries in Saskatchewan.

Rimbey area... The Alberta venture, in the Rimbey area, is 105 miles north of Calgary and 6 miles southwest of the Homeglen D3 oil discovery. That well cored into a D3 oil-bearing zone early this week, at an elevation that appeared to be similar to that of the Homeglen oil discovery well to the north. Several drill-stem tests have been run in that reef section below the gas cap, and although full details of those tests have not as yet been released, it is believed that the well will result in commercial oil production.

This well, Calmont 1 Rimbey, encountered over 100 ft. of wet-gas zone, and is currently testing at around 8,024 ft., some 20 ft. below the estimated gas-oil contact. Gravity of the oil given up on drill-stem tests is around 41.7°.

Although the Rimbey well is believed to be on the same structure as the Homeglen discovery, that fact has not as yet been established and full thickness of the oil zone is not determined. The Homeglen well indicated about 95 ft. of gas cap and some 30 to 35 ft. of oil zone below.

Dewar area... One of this week's gas strikes was made by Canada Southern Oils, Ltd., in the Dewar area of southwest Saskatchewan, 20 miles northwest of Kindersley and 7 miles west of Driver area oil and gas production.

Canada Southern 6-14 Dewar found an estimated 5,000,000 cu. ft. per day gas flow in the Viking sand, during drill-stem test at bottom 2,388 ft. The well has been deepened and tested the Cretaceous, which was nonproductive, has been plugged back for potential tests in the Viking gas sand.

The other Saskatchewan gasser was drilled by the Tide Water group, near Java, in the southwest portion of the province. This well, Tide Water-Java 10-29, Crown is 115 miles southeast of the Dewar gas find and 11 miles due west of Swift Current. During drill-stem test at 3,236 ft., the well flowed gas at rate 2,000,000 cu. ft. daily. Coring and testing is being continued at this venture which is ⅜ mile southwest of Tide Water's Jurassic oil discovery well in the area.

Samson Lake... The first follow-up to the Seaboard-Honoulu-Merrill and Canadian Gulf Oil Co.'s D3 oil discovery io the Samson Lake area of central Alberta, 125 miles north-northeast of Calgary, has been assured of commercial oil production from the D3 formation. This new success, Seaboard-Gulf 8-20 Samson Lake, LSD 8, 20-43-22w4, ¼ mile north offset to the discovery, contacted the D3 zone at 5,356 ft., or 2,751 ft. subsea, about 6 ft. lower than the discovery. Oil flowed to surface during a 12-minute test of interval 5,346 to 5,369.5 ft., and crew is now preparing to run production casing for completion.

Sibbald area... Viking sand gas production has been assured the Sun Oil Co.-Royalite Oil Co.-Canada Southern Oils, Ltd., team at its current driller in the Sibbald gas producing area of southeastern Alberta.

This team's most recent success, Sun-Canada Southern-Royalite 1 Benton, LSD 7, 28-27-3w4, was assured of commercial gas production during test of interval 2,534-2,542 ft. That test flowed gas at 638,000 cu. ft. daily. The well was carried down to the Cretaceous formation, but after failing to indicate gas or oil in any volume, was plugged back to the Viking where production casing has been set. The 1 Benton will be shut in after potential tests are run, pending a market outlet for its product.

Sylvan Lake... The California Standard Co. is preparing to run production casing at its 5-16 Sylvan Lake wildcat in LSD 5, 16-38-2w5. This well indicated discovery of natural gas in the Mississippian limestone horizon during drilling operations. The well was carried down as a test of the Devonian to 9,498 ft., and has been plugged back to 8,410 ft. Drill-stem test of interval 7,012 to 7,049 ft. flowed gas at 4,200,000 cu. ft. daily.

MISSISSIPPI

Madison County Test Gets Smackover Shows

Exploration for Smackover production in Mississippi received some encouragement the past week from gas showings encountered in the Smackover formation at a deep test, being

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"The Children's Friend." A character sketch at a Broadway crossing, New York City, opposite a young Ladies' school. 1877.

drilled by Carter Oil Co. in northern Madison County, in the central part of the state. Although their commercial value is not known, the showings reportedly are the best yet obtained from the Smackover in this state.

Location of the test, 1 Brown, is in the C SE NW 31-11n-4e, approximately 6 miles southeast of the Pickens field, on the Madison-Yazoo county line.

Top of the Smackover has not been determined definitely but by samples is indicated to be 12,136 ft. with surface elevation of 262 ft. A diamond core cut at 12,145-95 ft. recovered 11 ft. of sand, 9 ft. of dolomitic limestone, 16 ft. of sand, 11 ft. of dolomite, and 2 ft. of oolitic limestone. It carried a slight to good odor of gas. A drill-stem test, using ¼-in. chokes and 3,000 ft. of water cushion, had the cushion water at the surface in 45 minutes, and gas in 80 minutes. Top pressure was 1,300 psi. with tester open and 1,500 psi. closed. Bottom-hole pressure was 4,375 psi. flowing and 5,800 psi. shut in. Breakdown recovery was 310 ft. of 35.6°-gravity, light-colored fluid, which would evaporate rapidly. No water was indicated.

The core taken was tight with permeability ranging from zero to 28 md. and porosity averaging 14 to 16 per cent. Average permeability was 2 md.

Gas flow during the drill-stem test was ignited but only part of the gas would burn, indicating a possible high carbon dioxide content. Gas encountered in other Smackover tests drilled in Madison and adjoining counties has been noninflammable.

Casing is being run but operators plan to deepen the hole before making further tests.

The test is a unitized project participated in by Southern Natural Gas Co., Phillips Petroleum Co., Gulf Refining Co., Continental Oil Co., Union Producing Co., and Seaboard Oil Co., in addition to Carter Oil Co.

NEW MEXICO

SOUTHEAST NEW MEXICO

Texas-Pacific Wildcat Running High

Texas Pacific Coal & Oil Co. 1 Lane Mills Unit, Lea County wildcat in 32-15s-32e, was drilling below 13,044 ft. in lime and shale and looking for top of the Devonian.

This is an important test, 2 miles north of Continental Oil Co.'s prolific Devonian discovery at 1 Anderson Ranch. On top of the Mississippian, Texas Pacific's well was running 300 ft. high to 1 Anderson Ranch, which was said to be accounted for in part by the regional dip. Tops in the discovery were: Mississippian 12,700 ft., and Devonian 13,365 ft.

In Chavez County, Kewanee Oil Co. 1 Four-Mile Unit was still rigging up cable tools at total depth 6,572 ft., where circulation was lost.

NORTHWEST NEW MEXICO

Wood River Oil & Refining Co., Inc., 2 Walker, SW 10-31n-10w, San Juan County, is apparently good for 40 million cubic feet of gas daily from the Mesaverde formation after a 2,309-qt. shot. This is believed to be the largest open flow of any gas well from the Mesaverde formation in the entire San Juan basin.

KENTUCKY

EASTERN KENTUCKY

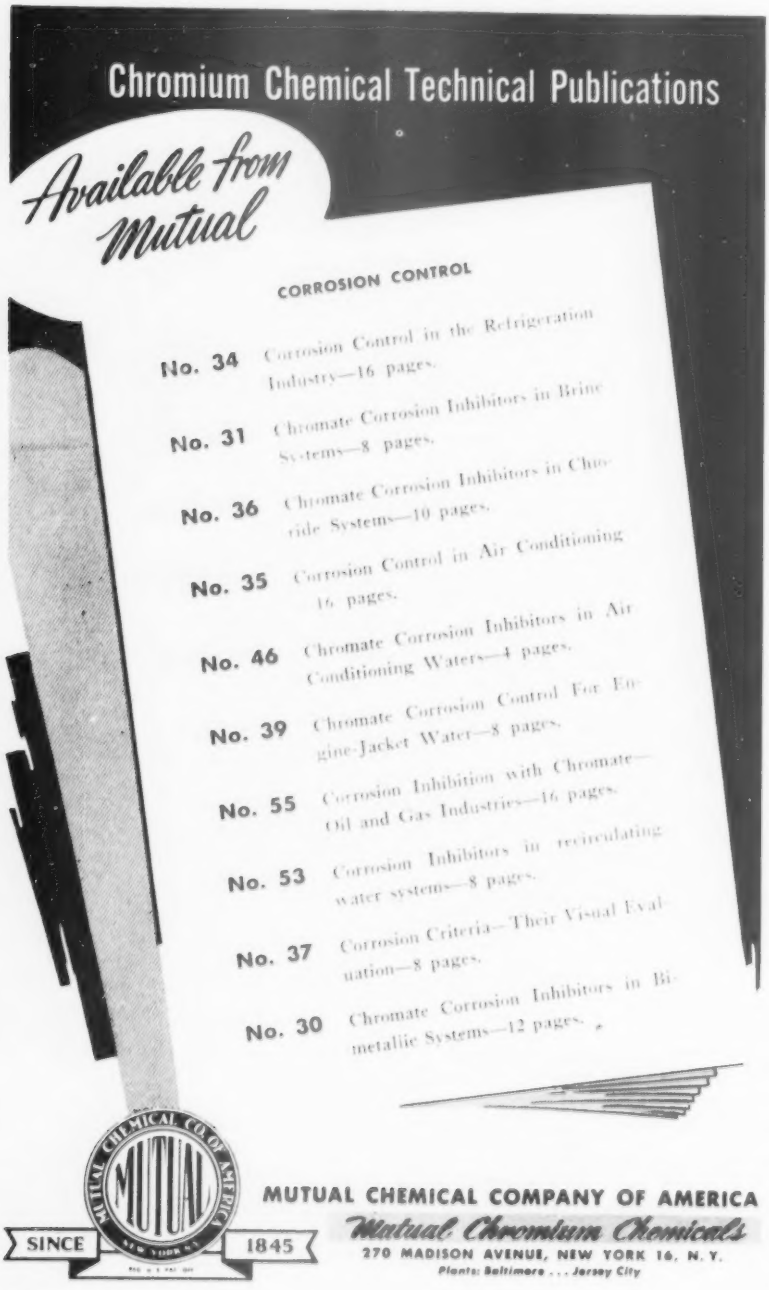
In Harlan County 3-F-76, Lowry Oil Co. is drilling a wildcat test on lands of the Inter-Mountain Coal & Lumber Co. Well is located approximately 11 miles NE of Harlan, the county seat. Operators are currently drilling at 1,300 ft.

In Carter County 3-U-79, Wolfe Creek Oil Co. is drilling at 939 ft. at 1 Violet Thomas, a wildcat 6½ miles south of Grayson. Slight shows of gas have been had within the Berea sandstone topped at 929 ft.

In Isonville pool of eastern Elliott County, Davis Court and Shaffer topped Weir sand at 783 ft. and located oil pay from 812 ft. to 843 ft. total depth. At that depth well looked like a small producer and operators have Hydrafraced in order to increase the oil yield. Operators are currently testing.

LEGAL

328.82 acres of Tribal and 2,786.60 acres of Allotted Indian Lands located in Twp. 11 N., R. 21; Twp. 12 N., Rges. 20 & 21; Twp. 13 N., Rges. 20 & 21 E., BHM, in the Cheyenne River Reservation, South Dakota, are being advertised for oil and gas leasing, bids on which will be opened May 26, 1953, at 2:00 P.M. C.S.T., at the office of the Superintendent of the Cheyenne River Indian Agency, Cheyenne Agency, South Dakota. Full descriptions and copies of the advertisement may be obtained from the Superintendent, Cheyenne River Indian Agency, Cheyenne Agency, South Dakota, or from the Oil and Gas Supervisor, U. S. Geological Survey, Federal Building, Casper, Wyoming.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WILDCAT COMPLETIONS

SOUTHWEST TEXAS

Bexer County: *Milton M. Cooke 1 Chuturich, Jacinta Pena Survey 9, IP IPP 12 BOPD, 38°, open hole 622-1,257 ft. TD 1,257 ft. (New pool).

Duval County: Sid Katz 2-E W. R. Peters, GB&CNG Survey 37, Dry. TD 2,586 ft.

Frio County: O. W. Killam 1 McKinley, S. G. Speed Survey 14, A-912. Dry. TD 4,904 ft.

Forest Oil Corp. 4 Halff & Oppenheimer, Josefa Martinez Survey 917, A-494. Dry. TD 4,060 ft.

Hidalgo County: *Superior Oil Co. 1 Johnson, E. P. Pue Survey 206, A-637. IP 25,500 M.c.f. daily, open flow, casing perforations 6,340-50 ft. TD 11,051 ft. (New pool).

Jim Hogg County: *Southern Minerals Corp. 1-A Silver Lake, El Sordo Grant. IP 73.15 BOPD, 10/64-in., 44°, casing perforations 4,125-31 ft. TD 4,158 ft. (New pool—Silver Lakes).

Nueces County: Appell Drilling Co. 1 Knolle Farms, Bluntzer Partition. Dry. TD 5,376 ft.

*Phillips Petroleum Co. 1-A Fish, State Tract 324, Corpus Christi Bay. IP no gage, 39°, casing perforations 7,664-66 ft. TD 8,799 ft. (New pool—Ransom).

Willacy County: *Humble Oil & Refining Co. 3-T Sauz Ranch Tenerias, San Juan de Carricitos Survey. IP 16,500 M.c.f. daily, open flow, casing perforations 7,847-97 ft. TD 9,000 ft. (New field—Tenerias).

Williamson County: Milburn and Jarrell Garonzik 1 Kubicek, P. L. Mahan Survey. Dry. TD 1,000 ft.

Zapata County: Interstate Minerals, Inc., 73 Lopez estate, TTRR Survey 257, Certificate 341. Dry. TD 3,262 ft.

GULF COAST

Brazoria County: Ralph Lowe 1-B Senior, DL & C Sur. A-604. Dry. TD 10,376 ft.

DeWitt County: J. R. Butler 1 Ladewig, A. Westphal and L. V. Criswell Sur., A-677 and A-116. Dry. TD 7,500 ft.

Fayette County: Sutton Drilling Co. 1 Gabitzsch, J. T. Whiteside Sur., A-107. Dry. TD 2,902 ft.

Galveston County: Chance Drilling Co., Inc., 1 Smith, L. Crawford Sur., A-48. Dry. TD 9,330 ft.

Goliad County: Currie B. Davis 1 Speakerman, Eliza Beasley Sur., A-61. Dry. TD 4,323 ft.

Harris County: L. D. Cain 1 Crooker, Joel Wheaton Sur., A-80. Dry. TD 8,515 ft.

* Jackson County: D. M. Wallace 1-A Miller, J. Fernandez Sur., A-21. IP 28,000 M.c.f. daily, open flow, casing perforations 5,469-73 ft. TD 6,070 ft. (New pool.)

* Liberty County: General Crude Oil Co. 2 Morris, P. Mason Sur., A-69. IP 45,000 M.c.f. daily, open flow, Cook Mountain 11,247-49 ft. (casing perforations). TD 11,826 ft. (New pool.)

Live Oak County: Hamman Oil & Refining Co. and States Marine Corp. 1 Goetze, M. C. Bulrice Sur. 335, A-535. Dry. TD 7,802 ft.

* Montgomery County: Sinclair Oil & Gas Co. 1 Bender estate, Montgomery School Land Sur., A-350. IP 175 BOPD, 10/64-in., 35.3°, Yegua 6,076-78 ft. (casing perforations). TD 6,453 ft. (New pay in Bender area.)

Tenn Production Co. 1 Foster, E. Read Sur., A-458. Dry. TD 6,961 ft.

Texmo Oil Co. 1 Fowler, Calvin Lynch Sur., A-314. Dry. TD 8,427 ft.

* Refugio County: C. G. Glasscock and Humble Oil & Refining Co. 1 State, Tract 8, Copana Bay. IP 118.8 BOPD, 7/64-in., 42.7°, casing perforations 6,856-58 ft. TD 7,520 ft.

* Victoria County: Houston Oil Co. of Texas 2 Gutman, P. Gallard Sur., A-32. IP 37.34 BOPD, 20/64-in., 27.2°, casing perforations 4,847-55 ft. TD 5,220 ft. (New pay in Battle field.)

P. R. Rutherford et al 1 Lander, W. B. Traylor Sur., A-335. Dry. TD 8,447 ft.

Washington County: Magnolia Petroleum Co. 1 Giddings estate, J. Stephens Sur., A-101. Dry. TD 10,500 ft.

EAST TEXAS

* Harrison County: Arkansas Louisiana Gas Co. 1 Anita Bookout, R. Ferguson Sur., A-254. IP 1,500 M.f.g., 14-in., Travis Peak 6,220-29 ft. TD 6,621 ft.

Sells Petroleum Co. 1-E Still Gas Unit, David Hill Sur. Dry. TD 7,000 ft.

Madison County: Group Oil Co. 1 Mrs. Alice Bailey, Keton Jones Sur., A-128. Dry. TD 10,860 ft.

Smith County: Vernon Whiteley 1 Isaac Hefler, Hezekiah George Sur., A-367. Dry. TD 7,700 ft.

TEXAS PANHANDLE

Collingsworth County: Tatum, Bennett & Depauw 1 A. F. Wishckamper Jr., 28-16-H&GN. Dry. TD 4,815 ft., elev. 2,199 ft., Mississippian 4,271 ft., Misner sand 4,401 ft., Ellenburger 4,451 ft.

WEST CENTRAL TEXAS

Brown County: M. T. Kelly 1 R. L. Brooks,

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WILDCAT COMPLETIONS

Sec. 350, J. Hernandez Sur. Dry. TD 1,200 ft.

* Callahan County: Allen Dykes 1 Katie V. Dugan, Sec. 84, BBB&C Sur. IPP BOPD, Cook sand 1,516 ft. TD 1,522 ft.

Coleman County: William L. Curtis 1-C McDonald, 272-116-Wade H. Bynum Sur. Dry. TD 1,907 ft.

Maxwell and Freeman 1 Ben Yarbrough, Sec. 72, CEPIM Sur., Dry. TD 1,600 ft.

Western Petroleum Co. et al 2 Hubert Stokes, Sec. 0, J. W. Robinson Sur. Dry. TD 3,623 ft.

Fisher County: Seaboard Oil Co. 1-A Ralph Collins, 48-Y-T&P. Dry. TD 7,050 ft., elev. 2,156 ft., Mississippian 6,858 ft., Ellenburger 6,947 ft.

* Haskell County: Ada Oil Co. 1 V. W. Meadors, Sec. 4, A. Hamil Sur., 4-162. IP 187 BOPD, ½-in., 40°, pay 5,010 ft. TD 5,702 ft.

Bridwell Oil Co. 2 T. G. Hendrick, Indianola RR Sur., A-297. Dry. TD 3,461 ft.

Woodson Oil Co. 1-A Coody, Sarah Smith Sur., A-372. Dry. TD 5,489 ft., elev. 1,479 ft., Ellenburger 5,378 ft.

Jones County: Great Lakes Carbon Corp. 2 L. P. Shapard, 14-4-H&TC. Dry. TD 4,525 ft.

Inca Drilling Co. 1 R. P. Ascell, Sec. 195, BBB&C. Dry. TD 3,403 ft.

Onyx Oil Co. 2 Hoke Propst, Sec. 22 & 21, Blk. 2, A. A. Deskin, J. W. McKissick Sur. Dry. TD 3,202 ft.

* Onyx Oil Co. and Lester & Diffield 1 A. L. Sprayberry, Sec. 41, OAL Sur. IP 115 BO 12 hours, ¾-in., 40°, pay 2,204-25 ft. TD 2,340 ft.

* West Central Drilling Co. 1 Wm. Wright, Sec. 13, Orphan Asylum Lands. IPP BOPD, 39°, pay 4,144-48 ft. TD 4,379 ft.

Palo Pinto County: Willis Drilling Co. 1 W. A. Gragg, Susan Latham Sur., A-281. Dry. TD 3,309 ft.

Shackelford County: W. E. Pittman 1 Laura Snyder, Sec. 29, Asylum Lands Sur. Dry. TD 700 ft.

Smith and Spratt 1 J. H. Nail, Sec. 7, ETRR Sur. Dry. TD 1,200 ft.

E. J. White and F. F. Bozeman 1 I. M. Chiam, Sec. 11, ETRR Sur. Dry. TD 835 ft.

Stonewall County: Sunray Oil Corp. 1 Pat Mitchell, 213-D-H&TC. Dry. TD 6,665 ft., elev. 1,808 ft., Mississippian 6,330 ft., Ellenburger 6,576 ft.

* The Texas Co. 1 H. E. Carr, 3-B-AB&M. IP 134.5 BO 10 hours, ¾-in., 39°, sand pay 5,166 ft. TD 5,171 ft.

Taylor County: Blackwell Oil & Gas Co. 1 Sandusky, 5-18-T&P. Dry. TD 5,463 ft., Ellenburger 5,374 ft.

Connally-Jackson 1 Xenia A. Miller, Sec. 33, Blind Asylum Land Sur. Dry. TD 4,139 ft.

NORTH TEXAS

Archer County: F. T. Johnson 1 A. Pastusek, Blk. 17, Meades LM Pasture. Dry. TD 1,553 ft.

Miami Operating Co. 1 Lorena Kinder, 58-5-Clark & Plumb. Dry. TD 5,742 ft.

Wm. L. and C. W. Snoddy 1 Richardson Trust, Blk. MEP&P. Dry. TD 1,350 ft.

Grayson County: Howell, Holloway & Howell 1 Shannon, Asa Hartfield Sur., A-491. Dry. TD 5,531 ft.

Humble Oil & Refining Co. 1 Mack Williams, D. Yglesia Sur., 1¾ miles N McMillan Oil Creek field. Dry. TD 14,363 ft., lower Strawn 10,724 ft.

* Jack County: Ada Oil Co. 1 Ova Jackson, Wm. Jackson Sur., A-2201. IP 291 BOPD, 18/64-in., Strawn sand 3,469 ft. TD 3481 ft.

Curran-Kiel Drilling Co. 1 J. P. Keller, I. H. Martin Sur., A-1702. Dry. TD 3,481 ft.

Fields and Lohan 1 Minnie Graves, Lot 3, S. Pritchard Sur., A-459. Dry. TD 554 ft.

T. G. Shaw 1 Dave Williams, E. R. Williams Sur., A-1204. Dry. TD 4,935 ft.

E. L. Wilson 1-B Worthington, J. Sanchez Sur., A-516. Dry. TD 5,368 ft.

Montague County: F. Kirk Johnson 1 Alexander heirs, Blk. 29, J. Y. Castillo Sur. Dry. TD 6,160 ft.

Wilbarger County: Larson & Thomas 1 W. H. Taylor, 56-A-1866-H&TC. Dry. TD 5,060 ft.

Frank Wood 1 W. T. Waggoner "Talley," 40-4-H&TC. Dry. TD 2,503 ft.

* Wise County: Texola Drilling Co. 1 W. B. Browning, A. D. Burris Sur., A-55. IP 82.6 BOPD, ¾-in., 42°, Bend conglomerate 5,660 ft. TD 5,679 ft.

Young County: Larson & Thomas 1 J. F. Hall, D. Akin Sur., A-2238. IP 32 BOPD, 15/64-in., 42°, pay sand 3,325 ft. TD 3,347 ft.

Ted A. Norwood 1 Allar Co., John Sanders Sur., A-251. Dry. TD 3,620 ft.

WEST TEXAS

Concho County: B. L. Woolley 1 O. L. Syms, Christian-Kirchrer Sur. 60. Dry. TD 4,283 ft., elev. 1,672 ft., Ellenburger 4,062 ft.

Dawson County: Sun Oil Co. 1 C. S. Dean, 22-1-J. Poitevent Sur. Dry. TD 10,201 ft., elev. 2,845 ft., reef 8,635 ft., Woodford 10,138 ft.

Ector County: Forest Oil Corp. 1-C Fasken, 20-42-TTN-G&MMB&A. Dry. TD 4,830 ft.

Hockley County: Western Drilling Co. 1 DeLoache, 4-81-Shackelford CSL. Dry. TD 5,002 ft.

Howard County: B. L. McFarland Drilling

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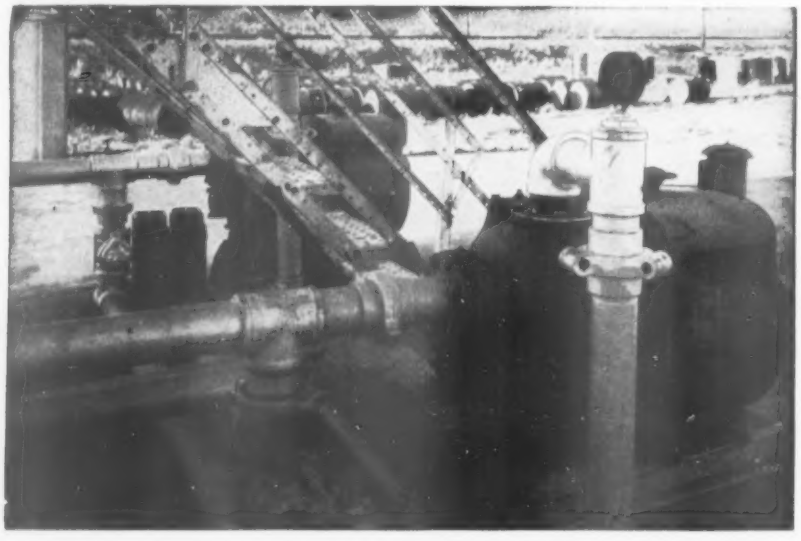

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WILDCAT COMPLETIONS

Co., Inc. et al 1-35 Mildred M. Jones, 35-33-T3N-T&P. Dry. TD 8,625 ft., elev. 2,758 ft., reef 8,595 ft.

King County: Shell Oil Co. 2-A S. B. Burnett, 17-A97-D&W. Dry. TD 8,140 ft., elev. 1,806 ft., Strawn 5,606 ft.

Runnels County: Henson Drilling Co. 1 Harry Lynn, Sec. 432, Roma Christa Sur. Dry. TD 4,165 ft.

* Schleicher County: Humble Oil & Refining Co. 1 Olivia Spencer, 176-A-HE&WT. IP 9,000 M.f.g., 27 bbl. 64° distillate, Strawn 6,736 ft. TD 6,978 ft.

Scurry County: Blount Drilling Co. 1 Hoyle H. Cary, 111-97-H&TC. Dry. TD 7,718 ft., elev. 2,194 ft., Canyon 7,140 ft.

Sutton County: C. L. Norsworthy, Jr. 1 T. A. Morriss, 82-C-HE&WT. Dry. TD 7,730 ft., elev. 2,184 ft., Strawn 6,818 ft., Ellenburger 7,660 ft.

Norsworthy 1 Sawyer, 170-C-HE&WT. Dry. TD 10,118 ft., elev. 2,136 ft., Strawn 8,309 ft., Ellenburger 9,698 ft.

* Tom Green County: LaGloria Corp. and H. B. Poff 1 Mona G. Kent, 152-11-SPRR. IP 43 BOPD, 12/64-in., 40°, Canyon sand 4,265-67 ft. TD 4,755 ft.

J. R. Medlock 1 Washington School Lands, Lge. 106, Washington CSL. Dry. TD 660 ft.

Murphy Corp. 1 E. H. Jones, Sec. 759, Anton Leitenberg Sur. 759. Dry. TD 5,860 ft., elev. 1,980 ft., Strawn 5,804 ft.

SOUTHEAST NEW MEXICO

* Chaves County: Republic Natural Gas Co. and Seaboard Oil Co. 1 White Ranch, 34-11s-29e. IP 294 BOPD, ¼-in., 47°, Siluro-Devonian 8,719 ft. TD 8,775 ft. Discovery.

ILLINOIS

Clark County: W. Henigman 1 Wilhait, SW NW SE 18-11n-13w. Dry. TD 600 ft.

Franklin County: Calvert Drilling Co. and G. Hoffman 2 Ziegler Coal Co., SE NW SW, 19-7s-2e. Dry. TD 2,828 ft.

Jefferson County: W. H. Davison 1 C. W. Rather, NE SW NW 16-2-1e. Dry. TD 2,205 ft.

Marion County: Ryan Oil Co. 1 H. O. Carter, NW NW NE 19-4n-1e. Dry. TD 1,804 ft.

Montgomery County: National Association 1 E. T. McDavid, SW SW SW 7-8n-3w. Dry. TD 2,304 ft.

E. White 1 H. F. and T. P. Smithpot, NW NW NE 5-8n-7w. Dry. TD 550 ft.

Wabash County: Columbus Exploration Co. 1 J. L. Hamilton, NE NW SE 4-1s-13w. Dry. TD 1,749 ft.

West Drilling Co. 1 J. J. Stelzer, NE NW SW 36-1s-13w. Dry. TD 2,752 ft.

Wayne County: J. G. Brown 1 Gilbert, SW SE NW 7-3s-5e. Dry. TD 3,225 ft.

INDIANA

Dubois County: T. W. Drake 1 Schulte, NW NE NE 20-3s-5w. Dry. TD 1,095 ft.

Posey County: C. E. O'Neal 1 Blackburn, NE SW SE 28-6s-13w. Dry. TD 2,981 ft.

Sullivan County: Superior Drilling Co., Inc. 1 McKinney, NE NE NE 29-9n-9w. Dry. TD 700 ft.

C. Harmon 1 Kennett, NE SE NW 19-9n-10w. Dry. TD 1,622 ft.

V. R. Gallagher 1 J. McFadden, NW NE SE 29-9-10w. Dry. TD 2,585 ft.

MICHIGAN

Jackson County: Allied Investments, Inc. 1 Tribby, NW SW NE 36-3s-3w. Dry. TD 1,805 ft. in Traverse.

Missaukee County: Mogul Oil Co. 1 State-

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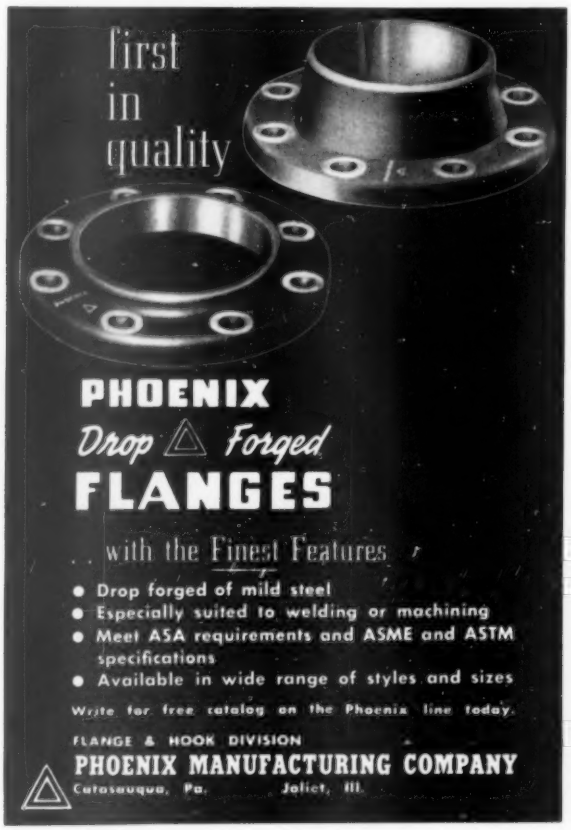
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WILDCAT COMPLETIONS

Pioneer, SE SE NW 15-24n-7w. Dry. TD 4,914 ft. in Richfield.

* Muskegon County: Taggart Bros. Gas Co. 1 Kessler, NW SW NW 7-12n-17w. 500,000 cu. ft. of gas daily, est. after 1,500 gal. acid, Niagaran 3,724 ft. Pay 3,732-3,805 ft. TD 3,995 ft., PBTD 3,985 ft.

OHIO

Licking County: Waverly Oil Works Co. 1 Wm. McInturf, 4th Qr. Dry. TD 2,743 ft. in Clinton.

* Tuscarawas County: Blackstone & Ebersbach 1 John Gooding, Lot 10, IP 170 M.c.f. daily, Berea 805-862 ft., TD 862 ft.

FLORIDA

Washington County: A. R. Temple 2 J. R. Moody, C SE SW 30-2n-15w. Dry. TD 4,719 ft. lower Tuscaloosa 4,536 ft. Massive 4,645 ft.

GEORGIA

Decatur County: J. R. Sealy 1 Fee, 1,677 ft. W and 183 ft. S of Land Lot 247, Land Dist. 21. Dry. TD 2,631 ft.

MISSISSIPPI

Itawamba County: Whitlock-Share Products Co. 1 W. H. Summers, Sec. 7-10s-9e. OWDD. Dry. TD 1,168 ft.

Jefferson County: R. H. Alagood-L. Cashion Co. 1 David Junkin, Sec. 22-9n-2w. Dry. TD 6,105 ft. Artman 5,404 ft.(?)

Jones County: Atlantic Refining Co. 1 Minnie Grafton et al, Sec. 34-9n-12w. Dry. TD 6,496 ft. base Chalk 6,240 ft.

Pontotoc County: O. W. Killam 1 M. H. Clayton, Sec. 7-10s-4e. Dry. TD 2,378 ft. Iowa 2,350 ft.

Wayne County: Daws-Stanley-Cashion 1 Robert Lee Dean, Sec. 27-10n-8w. Dry. TD 6,502 ft. Middle Tuscaloosa 6,364 ft.

* Wilkinson County: Calto Oil Co. 1-A Crosby Lumber Co., Sec. 4-4n-2w. IP 2,000 M.c.f. of gas per day plus 4 bbl. condensate, 51°, 10/64-in. TD 7,010 ft.

SOUTH LOUISIANA

Acadia Parish: H. L. Hawkins 1 Ora Childs, 55-7s-1e. Dry. TD 9,400 ft. (comp. as SI gas well 2-8-53. Attempted to rework and comp. thru. perfs. 8,595-99 ft. tested dry and TA 4-16-53.)

Lamson, Bennett & Cole 1 A. C. Hebert, 6-9s-1w. Dry. TD 12,708 ft.

* Lafourche Parish: Magnolia Petroleum Co. 1 Bowie Lumber Co., 1-14s-17e. IPF 165 BOPD, 3,950 M.c.f. of gas per day, 15/64, 53.3°, perfs. 11,578-588 ft. T/Pay 11,576 ft. TD 12,410 ft. (gas-condensate discovery.)

Texas Gulf Producing Co. 1 Octabe Aucoin, 65-17s-19e. IPR 415 BOPD, 13/64, GOR 819-1, 37.6°, perfs. 10,218-228 ft. TD 10,258 ft. (New gas-condensate pay in Lake Long.)

St. Mary Parish: Humble Oil & Refining Co. 1 Avoca, Inc., 33-16s-13e. Dry. TD 12,045 ft.

Terrebonne Parish: Shell Oil Co. 2 St. Lse. 2077, 19s-12e. Temp. abd. TD 11,200 ft.

NORTH LOUISIANA

Sabine Parish: Carter Oil Co. 20 Louisiana Long Leaf Lumber Co.-Core test, 192 ft. N and 394 ft. W of SEc NE NW 17-6n-12w. Dry. TD 2,150 ft.

Red River Parish: O. D. Clark Oil Co. 1 Marston, 2,324 ft. N and 1,370 ft. E of SWc 19-14n-10w. Dry. TD 2,660 ft.

OKLAHOMA

Alfalfa County: L. J. Horwitz 1 Frech, C NW SE 8-24n-11w. Dry. TD 7,308 ft.

Cotton County: J. Roland Craig and C. R. Caudill 1 High, SE SE SE SE 20-2s-11w. Dry. TD 2,003 ft.

Garfield County: Pure Oil Co. 1 North, SW SE SW 33-21n-4w. Dry. TD 6,810 ft.

Garvin County: Van-Grisso Oil Co. and Atlantic Refining Co. 1 Murray, NE NE NE NW 2-3n-1w. Dry. TD 4,729 ft.

Sun Oil Co. 1 Clark, NE NE NE 8-3n-1w. Dry. TD 4,971 ft.

Jackson County: Falcon Seaboard Drilling Co. 1 Mercer, SE SE NE 35-1n-23w. Dry. TD 5,384 ft.

Kay County: Atmar Drilling Co. 1 Wood, SW SW SE 32-25n-2w. Dry. TD 4,945 ft.

Lincoln County: Nadel & Gussman 1 Meyer, SE SE NE 31-13n-6e. Dry. TD 3,657 ft.

James B. Kite 1 Hubbard heirs, NW NW SW 28-15n-4e. Dry. TD 4,275 ft.

J. Tom Grimmett et al 1 Eagleston, NW NE NW 25-16n-4e. Dry. TD 4,585 ft.

* Logan County: Eugene Jordan Petroleum 1 Harback, SW SW SW 19-15n-1e. IPF 241 BOPD, second Wilcox 5,828-36 ft. TD 5,846 ft. (New pool.)

McCurtain County: Buzzbee 3 Epperson, SW SW SE SE 32-7s-23e. Dry. TD 330 ft.

B. R. Boucher 1 Cook, NW NW NW NE 2-8s-23e. Dry. TD 268 ft.

Oklahoma County: R. M. Jordan 1 Buzzard, SW SW NW 8-14n-1e. Dry. TD 5,823 ft.

* Pawnee County: H. J. Schaefer et al 1 Meeker, SE SE SE 33-21n-5e. IPP 13 BOPD, Prue 3,109-18 ft. TD 3,317 ft.

Pontotoc County: Harry Schultz 1 Chaffin, NE NW NE 21-5n-7e. Dry. TD 1,616 ft.

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I. J. Hutton, Manager, The Bank of Toronto, *Edmonton, Alberta, Canada*

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Texas County: Cities Service Oil Co. 1 Hicks "C," SE SE NW 19-6n-10eCM. Dry. TD 4,123 ft. Topeka 3,010 ft.

Tillman County: O. P. Leonard 1 Woodall, NW NE NW 9-1s-17w. Dry. TD 2,722 ft.

R. Benton Ross 1 BLM, SE SE NW NW 15-5s-15w. Dry. TD 2,172 ft.

KANSAS

Barton County: Musgrove et al 1 Woodward, SE SE NE 32-16s-14w. Dry. TD 3,510 ft.

Mid Plains et al 1 Lichter, NE NE NE 35-17s-15w. Dry. TD 3,584 ft.

Butler County: Rex & Morris 1 Stucky, NW NW NE 6-23s-5e. Dry. TD 2,878 ft.

Cowley County: Laura Jane Oil Co. 1 Bolack, SW SE SW 21-32s-6e. Dry. TD 3,116 ft.

Decatur County: Anderson-Prichard Oil Corp. 1 Nitsch, SE SE SE 3-3s-29w. Dry. TD 4,188 ft.

Kiowa County: Wilkey & Hildebrand 1 Kennedy, NE NE SE 21-28s-20w. Dry. TD 5,000 ft.

Logan County: Wycoff & Williams 1 Teague, SE SE SE 23-13s-35w. Dry. TD 4,604 ft.

* Morton County: Cities Service Oil Co. 1 Soupiset "A," SE SE NW 2-33s-43w. IP 27,800 M.c.f. of gas per day, Topeka 2,907-3,263 ft. TD 3,400 ft. Lansing-Kansas City 3,174 ft.

* Cities Service Oil Co. 1 Sharp "C," SW SW NE 20-33s-43w. IP 10,700 M.c.f. of gas per day, Topeka 2,910-3,056 ft. TD 3,438 ft.

Pawnee County: GMR 1 Schartz, SW SW NE 15-22s-16w. Dry. TD 4,110 ft.

W. B. Guyer 1 Doerr, SE SE NE 13-23s-16w. Dry. TD 4,200 ft.

Rooks County: Long 1 Shaw, NE NE NW 10-6s-19w. Dry. TD 3,596 ft.

Musgrove 1 Baldwin "B," NE NE NW 11-9s-20w. Dry. TD 3,667 ft.

* Continental Oil Co. 1 Allphin, SW SW NW 33-10s-20w. IPP 497 BOPD, Arbuckle 3,729-36 ft. TD 3,736 ft. (Opens Allphin pool.)

Stafford County: Anschutz Drilling Co. 1 Weir, SW SW NW 33-24s-11w. Dry. TD 3,965 ft.

Woodson County: C. E. Ash 1 Holley, SE NE NW 18-25s-15e. Dry. TD 1,569 ft.

NORTH DAKOTA

Bottineau County: Lion Oil Co. 1 Magnuson, C SE SW 2-163n-77w. Dry. TD 5,094 ft. Interlake.

McKenzie County: Amerada Petroleum Corp. 1 North Dakota "B," C NE NE 16-149n-95w. Dry. TD 9,620 ft. Madison.

CALIFORNIA

Fresno County: Artnell Company 54-20 Rogue, 20-13s-12e. Dry. TD 5,632 ft.

* Kern County: O. M. Slosson Z Core Hole, SW NE 21-11n-18w. IPP 3 BO 5 hours, 28°, perforations 1,391-1,416 ft. TD 2,628 ft. (New Valv. pool discovery ½ mile west of Tejon Hills field.)

Oceanic Oil Co. 35-35 Valmar Comm., 35-29s-26e. Dry. TD 8,661 ft. C-2-17 CCMO, 17-32s-23e. Dry. TD 4,946 ft.

Intex Oil Co. 2 Hood-Wallace USL, 13-29s-20e. Dry. TD 1,735 ft.

Los Angeles County: Morton & Dolley 1 M J M & M-Radovich, 26-5n-17w. Dry. TD 4,155 ft.

Madera County: Coast-Parker, Inc. 23-24 Gill Ranch, 24-13s-15e. Dry. TD 5,525 ft.

* Orange County: The Texas Co. 1 Dinkler, NE NE 7-4s-9w. IPP 94 BOPD, 12 per cent cut, 15.1°, perforations 5,590-5,741 ft. in Pliocene sand. TD 7,392 ft. (New field discovery, "Olive.")

San Benito County: Many Angela Oil Co. 1 Mary Angela, 8-17s-11e. Dry. TD 1,218 ft.

Freedom Oil Co. 1 "Well,". 31-15s-11e. Dry. TD 1,290 ft.

San Luis Obispo County: Richfield Oil Corp. 75-3 Howard, 3-11n-28w. Dry. TD 6,038 ft.

Santa Barbara County: Hubbard S. Russell, H. A. Russell & J. H. Russell 2 Thomas B. Adam, 35-10n-34w. Dry. Miocene 5,822 ft., Cherty 6,090 ft. TD 6,115 ft.

WILDCAT COMPLETIONS

MONTANA

Beaverhead County: Cities Service Oil Co. 1 Emerich, W½ NW NE 33-14s-7w. Dry. TD 11,213 ft.

NEVADA

Elko County: Gulf Refining Co., Opr. 1 Dolly Varden unit, 36-30n-64e. Dry. TD 3,158 ft. (This test falls 11 miles north of the town of Currie and is the fourth well in the State of Nevada by a major company.)

WYOMING

* Big Horn County: George J. Greer 2 Government, NE SE NE 22-55n-97w. IPP 17 BOPD, TD 5,091 ft. (Frontier discovery, new field.)

Weston County: Yale Lewis 1 Elliott, C NW SE 1-43n-65w. Dry. TD 5,900 ft. Skull Creek 5,835 ft.

COLORADO

Jackson County: Continental Oil Co. 3 Hoye, NW NW NE Lot 2, 34-9n-78w. Dry. TD 6,358 ft.

Logan County: Roden, Darden & McRae and Balderson 1 State, NW NE NE 11-10n-53w. Dry. TD 5,152 ft.

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WILDCAT COMPLETIONS

MANITOBA

Imperial 13-4 Blue Wing Lake, LSD 13, 4-24-27w1. Dry. TD 1,401 ft.
Gould 14-3, LSD 3, 14-2-27w1. Dry. TD 3,363 ft.

SASKATCHEWAN

Shell Oil Co.-Albercan 2 Govenblock, LSD 16, 3-1-29w3. Dry. TD 5,500 ft.
Socony 10-5B Skibbereen, LSD 15, 10-11-24w3. Dry. TD 4,368 ft.

ALBERTA

* Western-Union 9-11 Samson, LSD 11, 9-44-24w4. Basal quartz oil success. TD 6,645 ft. PBTD 5,068 ft.
New British-Superior 2-22 East Barons, LSD 2, 22-12-22w4. Dry. TD 4,830 ft.
Skyline-Mic Mac & Associates 1 Monitor, LSD 6, 29-33-5w4. Dry. TD 4,500 ft.
Federated 4-27 Pine Lake, LSD 4, 27-35-25w4. Dry. TD 8,000 ft.
British-American-Cities Service-Anglo Canadian 16-11 Viewpoint, LSD 16, 11-45-20w4. Dry. TD 5,405 ft.
Amerada "S" F 33-34 Crown, LSD 7, 34-71-24w5. Dry. TD 9,469 ft.
Imperial 12-9-49-19 Kingman, LSD 12, 9-49-19w4. Dry. TD 5,775 ft.
Merrill-Seaboard-Superior 5-16 Meeting Creek, LSD 5, 16-43-19w4. Dry. TD 5,770 ft.

NORTHWEST TERRITORIES

Westerol 1 Liard Rapids, Approximate Township 143, Range 21w6. Dry. TD 552 ft.

BRITISH COLUMBIA

Pacific 10 Sunrise, LSD 8, 28-79-16w6. Dry. TD 6,805 ft.

Republic Supply Appointed Reflin Pipe Distributors

Louis Potomac, president of Reflin Co., Gardena, Calif., has announced the appointment of The Republic Supply Co. of California as distributors for Reflin pipe, a glass - fiber - reinforced, plastic pipe.

Reflin pipe is a laminate of glass fibers, distributed through a plastic bonding agent and molded into a corrosion-resistant pipe. A low heat-transfer rate permits the transmission of hot or cold liquids with very little change in temperature.

A full line of fittings makes Reflin pipe adaptable to all standard equipment, including valves, pumps, and tanks, and its general qualities of extreme toughness and tensile strength permit pumps to be operated at a constant peak in connection with it.

John J. Pike, president of Republic Supply Co. of California, center, signs distributor's agreement with Reflin Co., of Gardena, Calif., manufacturers of glass fiber-reinforced plastics pipe. Reflin's president, Louis Potomac, right, and W. Dale Russell, vice president, general sales manager for Republic, look on.

Norris Makes Personnel Changes and Additions

Edward C. Bolger, president of W. C. Norris, Manufacture, Inc., Tulsa, has announced the following changes and additions to the field sales force.

Dan Coates has joined the company as sales engineer with headquarters in Abilene, Tex. He was formerly associated with Baash-Ross Tool Co.

Doyle Bain has been assigned to the Rio Grande Valley territory in South Texas with headquarters in Corpus Christi, Tex. He comes to Norris from Wilson Supply Co.

Kenneth Cook, field man at Abilene, has been transferred to the hydraulic department, to devote full time to sales and service of Norris hydraulic long-stroke pumping units.

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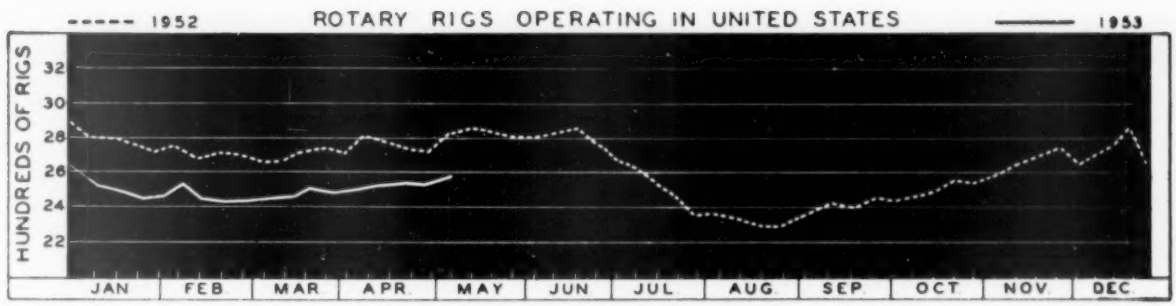
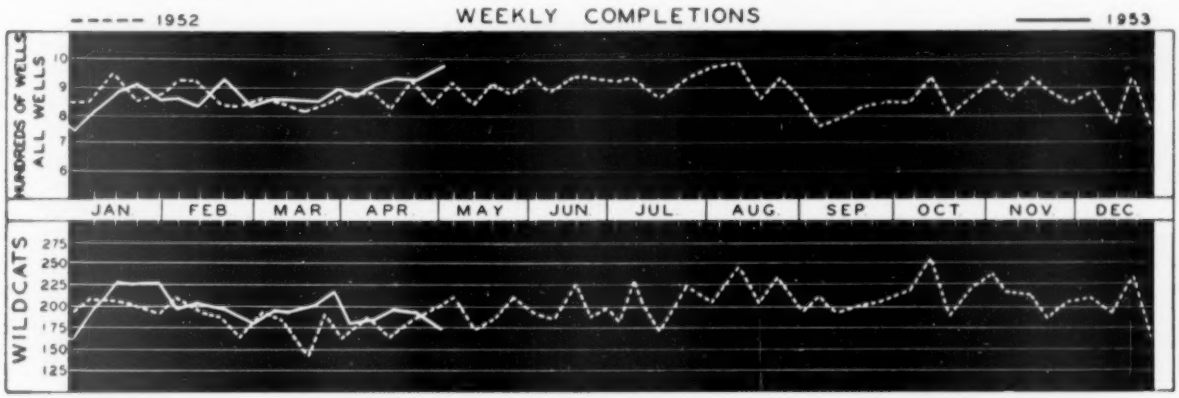




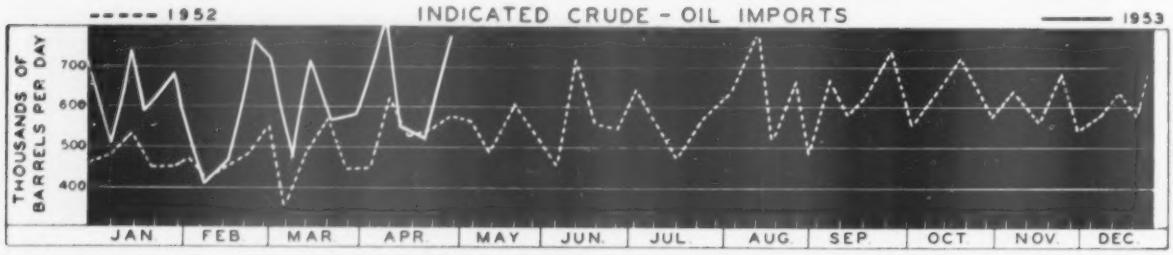
CURRENT STATISTICS

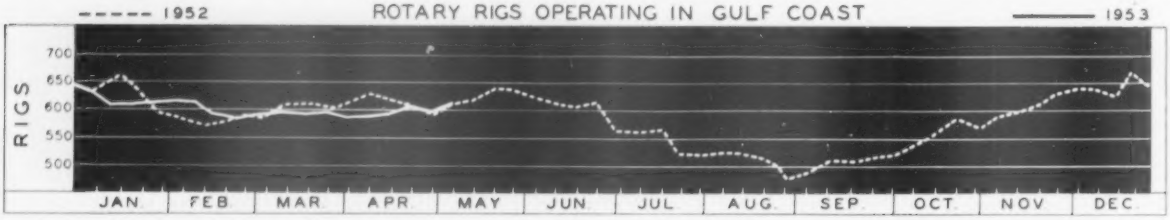
EXPLORATION

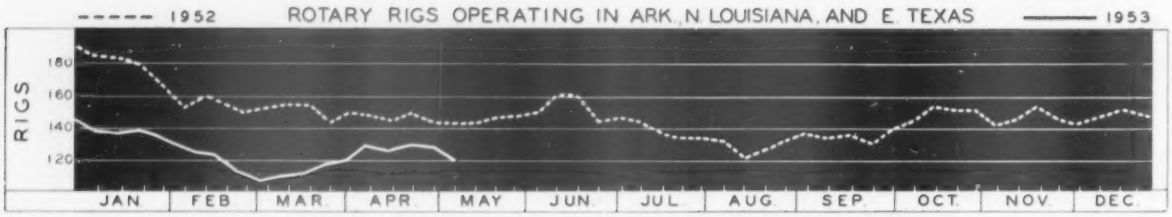
WEEKLY WELL COMPLETIONS . . . WEEK ENDED MAY 2, 1953

	Total of all wells					May 2		Wildcat completions and discoveries									
													Cumulative total, 1953				
	Comp.	Oil	Gas	Dry	Footage	1953	1952	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	13	7	0	*6	19,150	225	242	0	0	0	0	0	0	0	0	0	0
Pennsylvania	32	15	3	‡14	57,647	557	568	0	0	0	0	0	0	0	3	6	9
West Virginia	9	0	7	2	28,427	190	209	0	0	0	0	0	0	0	2	2	4
Ohio	25	7	7	‡11	63,905	335	311	0	0	1	1	2	1	0	1	9	11
Indiana	23	9	0	14	38,800	395	365	0	0	0	5	5	6	0	1	90	97
Kentucky	19	6	3	10	34,617	341	417	0	0	0	0	0	4	0	0	60	64
Illinois	26	10	0	16	64,493	548	502	0	0	0	9	9	1	0	0	107	108
Michigan	10	6	1	3	28,798	178	219	0	0	1	2	3	7	0	3	67	77
Kansas	122	51	19	§52	405,375	1,600	1,586	1	0	2	13	16	33	0	14	246	293
Nebraska	3	2	0	1	13,665	89	78	0	0	0	0	0	7	0	0	40	47
Oklahoma	138	77	8	*53	439,306	2,288	2,016	2	0	0	17	19	33	4	7	211	255
Texas	358	220	28	110	1,566,018	5,617	6,228	15	0	7	61	83	290	22	68	1,357	1,737
North Central (Dist. 7-B & 9)	146	91	1	54	486,328	2,045	1,941	8	0	0	30	38	151	0	8	571	730
West (Dist. 7-C & 8)	73	57	1	15	378,604	1,221	1,923	1	0	1	11	13	53	2	5	209	269
Panhandle (Dist. 10)	19	7	11	1	62,132	293	240	0	0	0	1	1	0	2	0	8	10
Eastern (Dist. 5 & 6)	24	14	2	8	121,834	266	302	0	0	1	3	4	8	1	2	85	96
Gulf Coast (Dist. 2 & 3)	41	19	5	17	275,793	842	935	3	0	3	10	16	42	5	30	212	289
Southwest (Dist. 1 & 4)	55	32	8	15	241,327	950	887	3	0	2	6	11	36	12	23	272	343
Louisiana	66	36	5	25	494,211	850	760	0	2	0	6	8	19	6	7	109	141
Northern	20	7	2	11	64,527	333	408	0	0	0	2	2	1	0	0	39	40
Southern	46	29	3	14	429,684	517	352	0	2	0	4	6	18	6	7	70	101
Arkansas	5	2	0	3	22,734	149	129	0	0	0	0	0	5	0	0	32	37
Mississippi	8	1	1	6	41,727	115	138	0	0	1	5	6	6	0	3	58	67
Southeastern States	3	1	0	2	13,544	47	18	0	0	0	2	2	1	0	0	33	34
Montana	7	4	1	2	43,511	121	52	0	0	0	1	1	1	0	0	32	33
Wyoming	10	8	0	2	50,208	195	200	1	0	0	1	2	5	0	0	32	37
Colorado	6	1	3	2	24,428	160	132	0	0	0	2	2	5	0	4	82	91
Utah	0	0	0	0	0	24	27	0	0	0	0	0	1	0	0	14	15
New Mexico	22	10	11	1	125,526	422	311	1	0	0	0	1	8	0	4	44	56
California	65	51	1	13	277,157	835	859	2	0	0	10	12	23	0	2	187	212
North Dakota	9	7	0	2	73,824	79	11	0	0	0	2	2	0	0	0	15	15
Miscellaneous (Nev.)	1	0	0	1	3,158	14	25	0	0	0	1	1	0	0	0	12	12
Total United States	980	531	98	351	3,930,229	15,374	15,403	22	2	12	138	174	456	32	119	2,845	3,452
Total previous week	937	499	62	376	3,896,807			24	2	5	159	190	434	30	107	2,707	3,278
Total May 3, 1952	906	482	75	349	3,758,000			32	0	9	167	208	485	35	90	2,694	3,304

Service wells included: *6, ‡12, ‡2, §3.



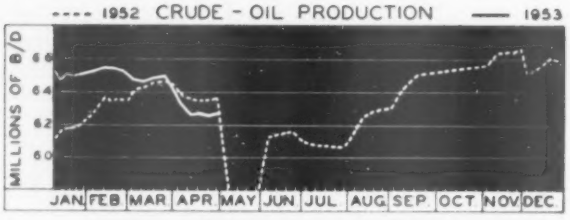


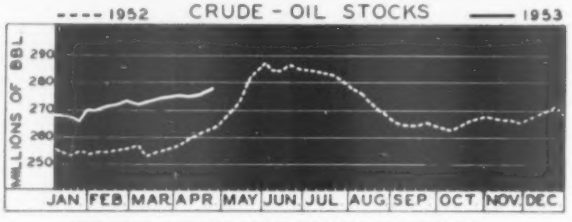


DAILY AVERAGE PRODUCTION FOR WEEK

	May 2			Apr. 25
	Crude oil	Lease condensate	Total	total
Alabama	4,700		4,700	4,800
Arkansas	76,700	600	77,300	77,300
California	1,000,800		1,000,800	998,900
Colorado	94,500		94,500	93,100
Eastern	57,600		57,600	57,300
Florida	1,500		1,500	1,450
Illinois	163,800		163,800	162,800
Indiana	35,700		35,700	34,900
Kansas	316,400		316,400	324,300
Kentucky	29,800		29,800	29,900
Louisiana	652,200	40,900	693,100	690,275
North	111,100	2,400	113,500	113,850
South	541,100	38,500	579,600	576,425
Michigan	33,900		33,900	34,600
Mississippi	93,350	4,850	98,200	96,100
Montana	30,600		30,600	31,000
Nebraska	13,300		13,300	13,100
New Mexico	186,000	700	186,700	185,475
Oklahoma	539,500		539,500	548,100
Texas	2,626,150	45,475	2,671,625	2,654,675
Dist. 1	34,500	350	34,850	34,525
Dist. 2	145,650	6,325	151,975	151,200
Dist. 3	436,950	23,000	459,950	460,300
Dist. 4	245,000	5,200	250,200	249,300
Dist. 5	46,550	400	46,950	46,950
Dist. 6	119,075	5,700	124,775	124,425
East Texas field	252,000		252,000	254,000
Dist. 7-B	104,400	75	104,475	103,025
Dist. 7-C	138,725	3,500	142,225	137,000
Dist. 8	866,325	200	866,525	857,850
Dist. 9	164,700	700	165,400	163,975
Dist. 10	72,275	25	72,300	72,125
Utah	5,000		5,000	5,200
Wyoming	207,600		207,600	208,200
North Dakota	13,900		13,900	14,300
Total U. S.	6,183,000	92,525	6,275,525	6,265,775
Change from previous week, up			9,750	
Canada	192,550		192,550	199,300
Total U. S. production January 1-May 2			786,040,225 bbl.	
Same period last year (crude plus cond.)			*778,489,600 bbl.	

*Includes 11,798,010 bbl. condensate.



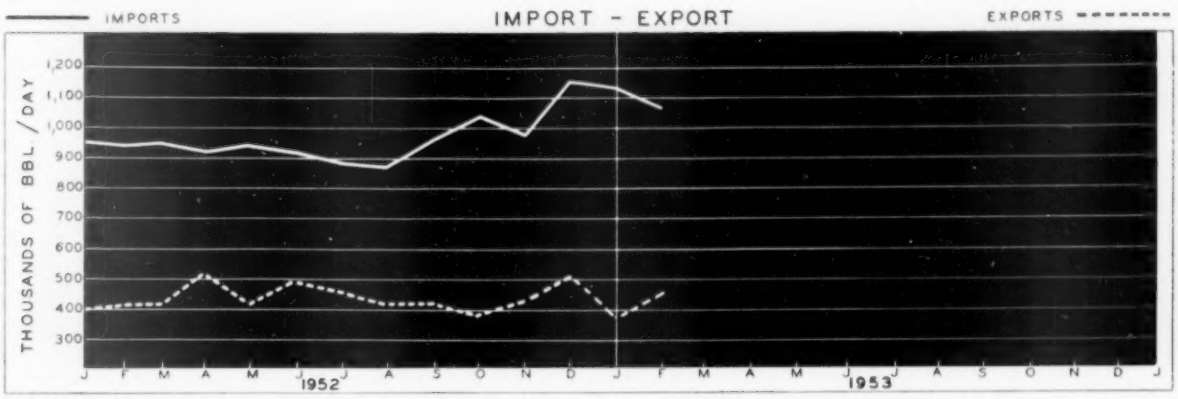


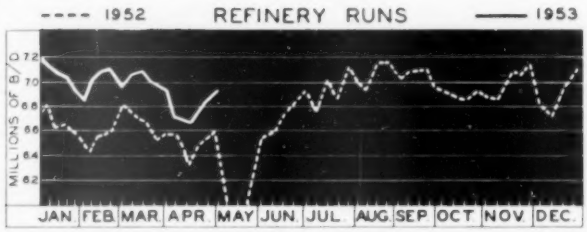
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

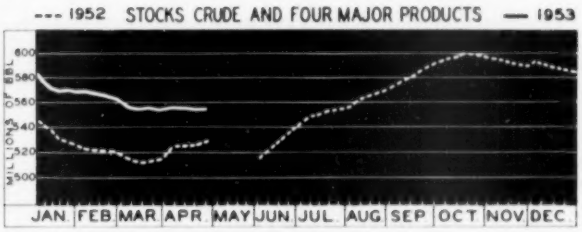
(Thousands of barrels)

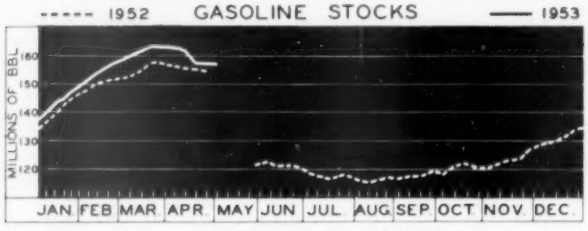
	Apr. 25, '53	Apr. 18, '53	Apr. 26, '52
Pennsylvania Grade	2,445	2,492	2,371
Other Appalachian	1,934	1,957	2,065
Illinois, Indiana, Michigan	10,748	10,908	11,499
Arkansas	3,050	3,203	3,002
Louisiana	16,202	17,141	14,449
North	2,737	2,789	2,756
Gulf	13,465	14,352	11,693
Mississippi	3,995	3,779	3,526
New Mexico	7,348	7,359	7,228
Oklahoma and Kansas	39,277	37,958	43,072
Texas	135,329	135,573	125,072
East Texas proper	11,753	11,308	11,605
West Texas	64,186	63,570	55,870
Texas Gulf	25,981	26,111	26,766
Other Texas	33,409	34,584	30,831
Rocky Mountain	16,369	16,492	15,077
California	33,316	32,558	30,157
Foreign	8,218	7,271	7,263
Total	278,231	276,691	264,781

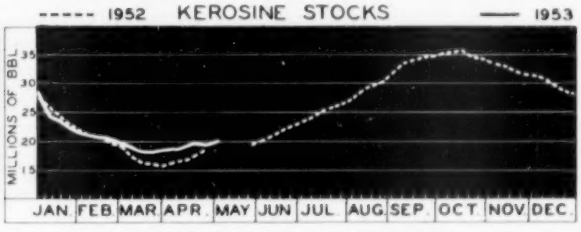
*Bureau of Mines.

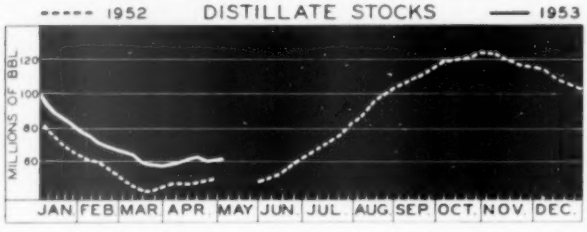


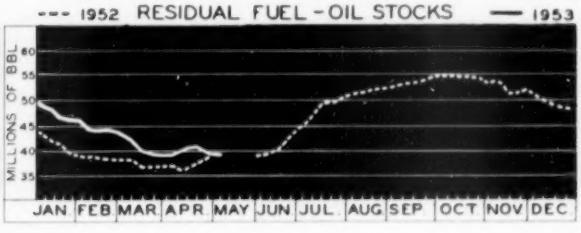










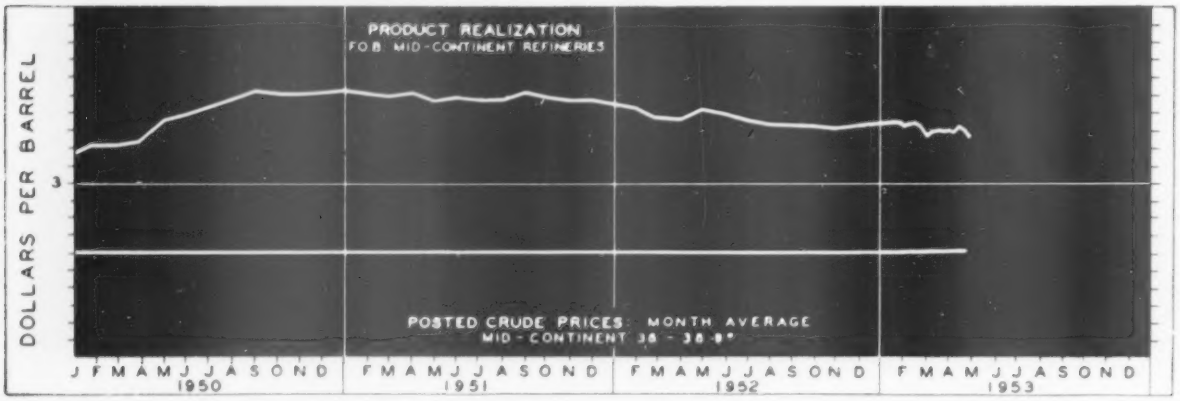


A.P.I. REFINERY REPORT, MAY 2

(Thousands of barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks‡ Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, May 1952 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	1,028	419.8	44.9	262.3	239.3	35,233	8,326	18,896	8,993	1,005	411.0	43.0	219.7	203.7
Appalachian:														
District 1	93	39.6	4.6	20.4	12.3	3,820	393	913	352	102	43.9	3.3	16.3	13.3
District 2	79	45.7	2.3	11.0	14.4	1,703	228	366	81	43	22.9	2.0	7.3	8.6
Ind., Ill., Ky.	1,192	652.6	69.8	208.2	158.7	34,361	3,395	8,575	3,212	741	378.1	37.3	127.4	105.0
Okla., Kans., Mo.	541	305.4	19.7	122.4	55.4	18,223	1,288	6,612	1,251	373	205.9	9.5	82.7	37.7
Inland Texas	270	176.3	16.9	38.1	35.4	6,410	318	1,201	944	269	187.8	12.4	41.6	42.2
Texas Gulf Coast	1,757	812.6	153.7	396.4	251.6	20,833	3,217	8,891	6,546	629	270.1	55.0	184.7	77.3
La. Gulf Coast	580	286.1	48.1	130.7	64.7	7,482	1,756	4,113	1,293	507	236.8	51.6	110.9	59.1
N. La. and Ark.	88	32.3	9.0	14.6	9.2	3,553	428	922	121	66	22.7	3.6	14.9	7.7
Rocky Mountain:														
New Mexico	19	11.7		2.9	3.7	148		33	29	17	10.1	.5	3.1	4.3
Other Rocky Mtn.	218	114.0	5.7	51.3	38.7	6,819	336	1,586	826	189	79.9	4.0	41.1	36.0
California	1,084	435.6	7.3	172.0	324.7	19,014	355	9,206	15,341	964	426.0	6.3	132.0	383.7
May 2, 1953	6,949	3,331.7	382.0	1,430.3	1,208.1	157,599	20,040	61,314	38,989	4,905	2,295.2	228.5	981.7	978.6
Apr. 25, 1953	6,827	3,308.4	380.7	1,380.9	1,265.6	157,990	19,433	60,343	39,034					
May 3, 1952						(Data incomplete for 1952 strike period)								

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.



In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.24 for week ended April 25, $3.28 for previous week, and $3.36 for April 1952. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of May 6, 1953. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	10¾-10½	12-12.75	10½-11
Premium gasoline	11¾-11½	13.125-14	11¾-12
42-44 w.w. kerosine	8⅜-8¾	10.15-10.65	8½-9
No. 2 straw fuel oil	7⅜-7¾	9.15-9.65	7½-8
No. 6 residual	$0.85-1.00	$2.10-2.25	$1.60-1.70

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5½	5	5¼
Grade 18-55	6.60	6.10	6.35

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	12-13
750 vis., No. 3-4 neutral	15-16
2,000 No. 5-6 neutral	17-18

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	20.5-22
200 vis., No. 3 neutral, 0-10 pp.	12-13

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	26.5
180 vis., 10 p.t. neutral	28.5

WAX

Mid-Continent

132-134 A.M.P.	5.5

RECENT market trends indicate that the 0.5-cent allowance on summer sales of distillate and kerosine on the East Coast is having some influence on the Gulf Coast market.

Some kerosine and No. 2 distillate has been reported available on the Gulf Coast at 8.5 and 7.5 cents a gallon, respectively.

Spot tanker rates softened slightly during the first few days of May. Dirty tankers were down to about 30 per cent below the Maritime Commission base, and clean vessels were about MC less 15 per cent.

With tanker rates at 15 per cent under MC, transportation cost on distillate moving from the Gulf Coast to the East Coast would be about 0.78 cent a gallon. Thus, the current quotation of 9.15 cents for barge delivery in New York Harbor does not leave much margin if No. 2 fuel is purchased at the old price of 8 cents on the Gulf Coast. If the price of 9.15 cents in New York Harbor becomes firmly established for the summer, more of the No. 2 on the Gulf Coast will move at the reduced quotation of 7.5 cents. Even a small increase in tanker rates would cause distillate fuels to back up in Gulf Coast storage, and this in turn would put pressure on Gulf prices.

Distillates in the Mid-Continent moved at above-normal rates in the last week of April because of cooler weather in the North Central states, but higher temperatures at the start of May caused shipments to drop back again. There has been no formal announcement of summer discounts in the market areas of the interior.

Slight indications of weakness in the interior gasoline market were reported in the first days of May. In most cases the below-normal sales represent slight overstocking by individual suppliers at certain pipe-line terminals. Most of the primary suppliers are trying to maintain near-peak inventories at points in the high-demand areas of the North Central states.

CRUDE PRICES GRAVITY SCHEDULE

	Signal Hill, Calif‡	Okla. homa, Kansas	Gulf Coast Tex.*	West Tex.†
14-14.9	$1.87			
15-15.9	1.93			
16-16.9	1.99			
17-17.9	2.05			
18-18.9	2.11			
19-19.9	2.18			
20-20.9	2.24	$2.25		$2.12
21-21.9	2.30	2.27		2.14
22-22.9	2.37	2.29		2.16
23-23.9	2.45	2.31		2.18
24-24.9	2.53	2.33	$2.56	2.20
25-25.9	2.61	2.35	2.58	2.22
26-26.9	2.69	2.37	2.60	2.24
27-27.9	2.76	2.39	2.62	2.26
28-28.9	2.83	2.41	2.64	2.28
29-29.9	2.91	2.43	2.66	2.30
30-30.9	2.97	2.45	2.68	2.32
31-31.9	3.04	2.47	2.70	2.34
32-32.9	3.12	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico.

Last general price change represented a 50-cent increase, effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Louisiana:	
Beauregard Parish	$2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.35
Conroe	2.83
Van	2.48
Pennsylvania Grade:	
Bradford	4.40
Southwest Pennsylvania	3.97
West Virginia	3.91
Illinois Basin	2.77

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5— 500 Bbl.	4— 250 Bbl.
10—200 Bbl.	

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Phone: LD 517

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3—GENERAL MOTORS TWIN DIESELS, Model 6-71-1203. Completely overhauled; heavy duty transfer gears, starters, and skids. Replaced by gas engines on EMSCO 750. Oil States Drilling Company, Dallas, Texas. Phone PRospect 8184; or can be inspected at W. A. (Al) Hughes Yard, Abilene, Texas. Phone 2-1911.

FOR SALE: Lee C. Moore Cantilever Mast, 415,000# capacity, 9' steel substructure; Wilson Giant Double Drum Drawworks, powered by two WAK Waukesha; two pumps, 12" Emsco and 10" Dean Bros.; 17½" Rotary; National 120 ton Block; 60 ton B. J. Hook. Write Box 3246, Corpus Christi, Texas.

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1—7¼ x 12 Gardner-Denver Model FXZ Power Driven Slush Pump unitized with skids, V-Belt Drive and NKU Waukesha Gas-Butane Engine.

All companion equipment including drill pipe, drill collars, dog house, pipe racks, etc., also available.

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or 6-9161, Box 4026, Odessa

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FOR SALE: Type 80 Cooper Twin Compressors, 175 KVA Generating Plant, water pumps, and water tanks. Alfred B. Kern, 223 Wright Building, Tulsa, Oklahoma.

FAILING CORE drill unit mounted on 1946 Ford, light plant, dog house on trailer, pipe & tools. Good condition. Can be bought on terms. Kelly Heyen, Dorchester, Ill.

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WE OFFER: Two casing pulling units—Hydraulic operated—in A-1 condition—together with two pickup trucks 1950 and 1952 models and two heavy metal tool houses and one circulating unit. Pipe Pulling, Inc., Stafford, Kansas.

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FOR SALE: One Cardwell double drum Mobilhoist with tools. James Oil Well Service, Ph. 3-2331 or P. O. Box 2196, Hobbs, New Mexico.

FOR SALE: 80,000' 4½ O.D. S.S. line, 60,000' 3½ O.D. line, 60,000' 6⅝ S.S. line. Lundquist Pipe & Supply Co., Phone 5-8850, Tulsa, P.O. Box 1215.

FOR SALE: 8—Shriver 42"x42" cast iron Filter Presses, Plate & Frame type, 18, 27, and 54 chambers, 1" cake; 15—Sperry 18"x18" cast iron Filter Presses, 11 chambers; 2—#12 Sweetland Filters for 36 leaves on 4" centers. Immediate shipment. Attractively priced. Consolidated Products Co., Inc., 17-20 Park Row, New York 38, N. Y. BArclay 7-0600.

TWO light shot hole drills. Hydraulic rigs mounted on used Ford trucks. Just came out of the field. Price $3500.000 each, with used water truck included. Located at 3820 N. W. 39th Street in Oklahoma City. Phone Windsor 2-4226. Young Exploration Company.

FOR SALE: No. 350 Oilwell six sheave heavy duty roller bearing crown block. Like new. G&H Supply Co., Box 4052 Phone Melrose 2-7886, Oklahoma City.

62,000 ft.—6⅝" OD Sch. 40 seamless PE Bev. Range 2, Cleveland, Okla. 6,500 ft.—4½" OD Sch. 40 seamless PE, Bev. Range 3, Cushing, Okla. 60,000 ft.—3½" OD T&C electric weld & seamless, New, Range 1, Houston, Texas. 45,000 ft.—4½" OD T&C electric weld & seamless, New, Range 1, Houston, Texas. 13,000 ft.—2⅜" OD J-55 upset tubing 4.70, New, Houston, Texas.

All Above Priced for Quick Sale.

Box 1858 W. C. BERRY Ph. 3-6141 Tulsa

FOR SALE

3—6'x10' 250# Welded Gas Scrubbers.

11—Griscom-Russell Shell and Tube Gas Coolers, Shell single pass; Tubes two-pass. 250# WP, 682 sq. ft. Admiralty Tubes.

2—Coolers same as above only for 500# WP. Heat exchangers, centrifugal pump, Clark Bros. and Cooper-Bessemer Compressor Cylinders.

C. J. Smith
Oil Capital Bldg., Tulsa
Phone 5-3416

EQUIPMENT FOR SALE

FOR SALE: Model R.L. 3-Drum Cardwell Spudder, Trailer Mounted, complete with all tailing-in tools. 7000 feet almost new 9/16-inch and ¾-inch lines. Will sell with or without tools. For full description and inventory, write Box G-466, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE COMPLETE surface pumping equipment for two wells including one single, one double reduction 4D Jensen Jacks, with weights and skids, electric motors, time switches, Etc. All new, used three months. $1500.00 value, priced to sell as a whole. Holmes, Phone 582, Box 435, Lawrence, Kansas.

10,000 NEW 1½" Standard Merchant Couplings. Special price $8.00 per hundred. Mr. Burke, P. O. Box 3235, Tulsa, Oklahoma. Telephone 6-2666.

AUCTION SALE of 3,000 foot rotary drilling rig. To be sold May 5, 1953. Crew will be on duty at 8 a.m. of sale date for demonstration, sale time 3 p.m. Description: Fred E. Cooper 563 rotary, draw works mounted on lowboy trailer, 7½ x 10 Gaso pump powered by model L Allis-Chalmers engine. Rig is complete except for drill pipe. Location: 2¼ miles east of Tyro, Kansas, south side of highway 166. Terms: cash or letter of credit. For further information contact George B. Emery, Jr., Box 498, Topeka, Kansas; or Bert Young, Box 311, Eureka, Kansas.

USED Franks Core Drill: Serial 2016 Mounted on International K-11 truck; includes: Swivel, 10 inch rotary table, 50 ft. single-piece derrick hydraulically raised, 3"x25' Kelly, butane system, less pump; reconditioned and painted. Also 1300 feet of 3½" drill pipe. Franks Mfg. Corp., Box 3218, Whittier Sta., Tulsa, Okla.

FOR SALE, F.O.B. Duncan, Okla., 2—2500 gallon practically new diesel fuel tanks complete with skids and racks (cost new $2500.00) $750.00 each. 1 used 6" kelly and bushing—$500.00. 4000 ft. used 4½" full hole A.P.I. drill pipe—$1.25 ft. J. E. Jackson, Box 61, Duncan, Okla. Phone 263.

EQUIPMENT WANTED

WANTED: Late Type 24L Bucyrus or equal 1500' well servicing unit; 4L Caterpillar with blade. Box G-484, The Oil and Gas Journal, Tulsa, Oklahoma.

WILL pay highest prices for your surplus valves, pipe fittings, welding fittings, etc. Send your list for prompt quotation to Box G-480, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED TO BUY: Good used 80 or 100 horse steamer for mounting on float or truck. Box G-466, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED TO BUY: Marginal or abandoned oil properties in Eastern United States. Give complete details first letter. Box G-432, The Oil and Gas Journal, Tulsa, Oklahoma.

NOTICE: We buy, We sell equipment everywhere. If you want to sell or buy, contact Pressey & Son, Pueblo, Colorado.

WE BUY SURPLUS VALVES and FITTINGS

We want your surplus valves, flanges and fittings. Write or call.

Newman's Inc.
700 So. Maybelle Tulsa, Okla.
LD 635 Phone 2-5228

EQUIPMENT WANTED

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

HELP WANTED

WANTED: Energetic, conscientious and capable petroleum engineer as production superintendent for well-established independent company. Experienced in completing, equipping, drilling practices; taking of BHP and OGR tests. Excellent opportunity for one with real ambition. Replies strictly confidential. Write complete data and salary expected. Box G-464, The Oil and Gas Journal, Tulsa, Oklahoma.

SOUTH AMERICA. These jobs are with one of the better oil companies. Our fee paid. Mechanical Engineer—graduate, no experience required. Petroleum Engineer—graduate, no experience required. Chemical Engineer—graduate, no experience required. Mud Technician—two or more years' experience, single. Accountant—college graduate, Accounting major, single. All information confidential and should be mailed to CHAS. J. LOVELESS PERSONNEL SERVICE, 616 S. Main, Tulsa, Oklahoma. Phone 3-5168.

INDEPENDENT OIL COMPANY desires geologist on part-time basis. Should be experienced in mapping and checking desirable areas for lease plays and drilling. Give full details on educational and experience backgrounds and remuneration desired. All replies confidential. The Oil and Gas Journal, Box G-483, Tulsa, Oklahoma.

TERMINALS ENGINEER & Supervisor: To supervise construction and maintenance of petroleum products terminals. Age to 40. Experience such work necessary. Engineering degree desirable but not required. Locate in Southeast. Some travel required. Salary open. In applying give complete details as to personal, educational and experience background, and salary expected. Box G-475, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANT—Under 30, Male, Accounting major, upper fourth of class, benefit plans, major crude oil pipeline company, location small East Texas town, career man only. Address communications giving background, experience, and salary desired to P. O. Box 2383, Longview, Texas.

LUBE OIL BLENDING AND PACKAGING SUPERVISOR

Responsible for the operations of a modern blending and packaging plant which is a part of a complete refinery of an independent oil company in the southwest. Must have thorough knowledge of drum reconditioning, drum and can filling, box car shipping, and lube oil blending operations. College degree preferred. Salary open subject to experience and qualifications.

Box G-461, The Oil and Gas Journal, Tulsa, Oklahoma

ENGINEERS WANTED

Anderson - Prichard Oil Corporation, Oklahoma City, Oklahoma, has Production Department openings for several engineers with degrees in petroleum or mechanical engineering. Excellent opportunity for young man interested in oil producing and drilling operations or reservoir and evaluation work. A year's experience is desirable, but college education and willingness to assume responsibility are essential prerequisites. Initial location will be Oklahoma City. Applicants should write giving age, brief review of education and experience, and salary expected. Please address

ANDERSON-PRICHARD OIL CORPORATION

Liberty National Bank Building, Oklahoma City, Oklahoma, for the attention of Mr. D. F. Tver, Industrial Relations Department.

HELP WANTED

SALES REPRESENTATIVE. Age 28 to 40 mechanical background contact oil industry Rocky Mountain oilfield territory. Headquarter in Casper, Wyoming. Excellent future in one of the oldest firms in their field. Car, expenses, plus salary commensurate with background and ability. Applicants must furnish complete background of employment, education, also other qualifications in initial letter. Replies treated confidential. Box G-481, The Oil and Gas Journal, Tulsa, Oklahoma.

MUD MAN

We are looking for a man who has actual experience in the field with drilling mud. Experience should be either on the rig, with a mud supply house, or a mud service company. We need an area supervisor who is interested in greater earnings with an established and growing manufacturer. Our organization knows of this ad. Write Box G-474, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES MANAGER

Men between ages 27 and 42 to handle sales of oil field drilling and production equipment. Manufacturer is represented in all major oil fields in United States. Applicants must have previous experience in handling men and selling to oil field drilling trade. Man can make good salary at present volume with excellent opportunity to increase sales. Write **Box G-459, The Oil and Gas Journal, Tulsa, Oklahoma.**

MAINTENANCE SUPERINTENDENT

Wanted by smaller Kansas refinery with ambitious plans. Excellent opportunity for man who can handle men, read blue prints and carry out miscellaneous construction and maintenance **AND** who wants to grow and advance with the organization. Give details of experience, references and salary desired. Our own people know of this ad. Reply to

Box G-458

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

PETROLEUM ENGINEERS

FOREIGN SERVICE

Graduate engineers with good background in general physics, mathematics, mechanics and with some laboratory experience in equipment and techniques. For laboratory position responsible for theoretical experimental studies on reservoir fluid and rocks. Duties will consist of designing equipment, performing or supervising testing and analyzing and reporting results. Studies pertinent to evaluation of primary depletion practices and applicability of secondary recovery for pressure maintenance operation will be required.

Please write giving full particulars regarding personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
BOX OG-5
Arabian-American Oil Company
505 Park Avenue
New York 22, N. Y.

HELP WANTED

LAND MAN

Large company which is well known in Southern states has recently opened a district Geological Exploration and Production office in New Orleans and needs for that office a land man familiar with South Louisiana. Such man should also have familiarity with Southern Mississippi. Prefer a man under 42 years of age and one familiar with farm-out negotiations, operating contracts, lease acquisitions and lease record procedure and titles. Company is entering South Louisiana on a conservative basis. In replying state age, experience in detail, education, and references, enclosing recent photograph. So as not to jeopardize your present position your application will be held in confidence. Box G-453, The Oil and Gas Journal, Tulsa, Oklahoma.

GAS ENGINEER

Independent producer of oil and gas needs experienced gas engineer to take charge of operation of gas properties and to assist with all production problems involving gas. Man filling this job needs experience in field operation of gas distillate wells, small field compressor installations, and gas-lift installations. Give resume of experience, enclosing small photograph if possible. Box G-436, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974. Tom Robinson, owner. For Technical and Trained Personnel, including LPG.

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

PETROLEUM ENGRS., GEOLOGISTS, REFINERY MEN; Rocky Mtn. positions with Majors and Independents. Specialists in drilling, production, reservoir, refinery operation. Professional Placement Service, 516 University Bldg., Denver, Colorado.

WANTED IMMEDIATELY—Man experienced in PVT analysis and interpretation to take charge of PVT Department in a commercial laboratory operating in the Rocky Mountains. Salary open. Write P.O. Box 279, Casper, Wyoming, or Telephone 3-5741.

PETROLEUM GEOLOGIST: About 35 years of age who has had experience in Permian and Pennsylvanian areas, as in West Central and North Texas, Oklahoma and Kansas, both subsurface and surface. Will headquarter in Fort Worth but must be willing to be away from home a reasonable amount of time. Give details of education, experience and salary expected. HILL & HILL, Attention: R. R. Thompson, Geologist, 1325 Forth Worth National Bank Building, Fort Worth 2, Texas.

ELECTRICAL AND INSTRUMENT ENGINEER

Responsible for the maintenance and installation of electrical equipment and instruments in a complete refinery of an independent oil company located in the southwest. Must have a degree in electrical engineering and at least 5 years experience in a refinery. Will assist Chief Engineer in developing specifications for electrical equipment and instruments. Will supervise the installation and maintenance of same. Salary open subject to experience and qualifications.

Box G-462, The Oil and Gas Journal, Tulsa, Oklahoma

PROPOSED INDEPENDENT OIL COMPANY
Will Require

EXECUTIVE VICE PRESIDENT—must have had administrative experience with producing company.

GENERAL SUPERINTENDENT—with knowledge of production and drilling practices.

THREE AREA GEOLOGISTS—to cover domestic oil country.

Give Fullest Possible Details

Box G-482

The Oil and Gas Journal
Tulsa, Okla.

HELP WANTED

SEISMIC PERSONNEL needed for United States and Canada by well known and expanding contract geophysical company. Address Box E-863, The Oil and Gas Journal, Tulsa, Oklahoma

SITUATIONS WANTED

GRADUATE Petroleum Engineer, age 33, married. 7 years' experience in drilling, workovers, production and sample analysis in West Texas, New Mexico, and San Juan Basin, with major oil company desires change. Will move to any of above localities or Rocky Mountain area. References if desired. Box G-468, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANT — 14 years experience in production department of Mid-Continent Independent. 37 years of age with family of three children desires position with aggressive production company. Have also had some field supervision experience in Kansas. Box G-467, The Oil and Gas Journal, Tulsa, Oklahoma.

SECRETARIAL and Office Management Business woman with extensive experience prefers small office Mid-Continent or Rocky Mountain area. Box 155, Tulsa, Phone 2-4427.

M.E. AND I.E. GRADUATE seeking manufacturers to represent in Okla. area. Three years selling experience. One year equipment buyer large oil company. Own car, single, free to travel. Box G-477, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY ENGINEER experienced in design, construction, and maintenance supervision of fluid and thermofor cat crackers, pipe stills and product treating. Desire relocation. Age 29. Box G-478, The Oil and Gas Journal, Tulsa, Oklahoma.

REGISTERED ENGINEER: Experienced in design, construction, maintenance, and relief supervision on gasoline plant and refinery units — crude, asphalt, catalytic cracking and product treating units. Twenty years diversified experience. Age 42. Desires relocation. Box G-443, The Oil and Gas Journal, Tulsa, Oklahoma.

PROCESS SUPERVISOR, Chemical Engineer, age 34, 10 years experience in refinery design, economics, and process supervision. Desires supervisory or technical position in progressive refinery or petrochemical plant. Box G-424, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN: Experienced in major company administrative and field land operations. College and legal education and licensed attorney. Desires change to expanding independent organization for responsible assignment. Box G-437, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, 32, five years Rocky Mountain and two years Mid-Continent—Gulf Coast major company experience wants job with independent company Rocky Mountain Area. Box G-440, The Oil and Gas Journal, Tulsa, Oklahoma.

ELECTRICIAN—8 years experience major chemical company—2 years utility company. Married—age 27—desires maintenance major oil company—South America. Box G-447, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 1628, Ph. No. 3-3141, Hobbs, New Mexico.

DISTRICT Landman, 37, married, seven years Texas experience, location open, excellent references. Box G-446, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEER, age 40, twenty years experience in drilling and servicing companies, including foreign fields, wants job with aggressive organization, preferably promoting new tools. Box G-472, The Oil and Gas Journal, Tulsa, Oklahoma.

RADIO ENGINEER, graduate, FCC license, site survey and licensing experience, five years in V.H.F. and Microwave field, desires position with pipe line company. Box G-421, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLING DEALS WANTED

RELIABLE well drilling contractor with good equipment desires connection with individuals or small groups wanting wells drilled, or a development program in Oklahoma. Will drill your lease or help you secure good leases and drill for you. Sellers and Sellers, Box 606, Holdenville, Oklahoma. Phone 1098.

GEOLOGISTS

NO OIL NO PAY—Geochemical exploration—Iroco Laboratory—P. O. Box 630, Stillwater, Okla.

PRODUCTION WANTED

INDEPENDENT Oil Company desires to purchase production amounting to at least 1,000 barrels per day. Submit full details together with competent engineering report. Confidential. Box G-404, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION WANTED

Independent operator desires to purchase oil or gas production in Texas, Oklahoma or Louisiana. Any amount considered. Prefer direct contact with owner. Confidential. Please furnish complete details and report if available.

Box G-476, The Oil and Gas Journal Tulsa, Oklahoma

LEASE AND DRILLING BLOCKS

CAN GET large block of acreage in New Mexico. Good geology. Will put together for expenses and some acreage. Box G-470, The Oil and Gas Journal, Tulsa, Oklahoma.

EASTERN independent individual interested from owners, small or large producing property with drilling locations old or new field can handle up to $20,000,000. Need full detail and competent engineers report. Confidential. Box G-469, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASES ROYALTIES

Producing and Nonproducing

Bought and Sold—Any Area

Inquiries Invited

B. D. BUCKLEY

6635 Delmar Ave., St. Louis 5, Mo.

Producing Property Wanted

Interested in acquiring oil or gas producing property with substantial reserves. Large deal preferred. Also interested in drilling deals. Contact

Box G-463, The Oil and Gas Journal, Tulsa, Oklahoma

Canadian Oil Royalties, Leases and Production

AS SPECIALISTS TRADING IN OIL PROPERTIES, WE INVITE YOUR ENQUIRIES.

WRITE:
810a FIRST ST. WEST,
CALGARY — ALBERTA
TELEPHONE: 65711

Simsbury OIL CORPORATION LTD.

LEASE AND DRILLING BLOCKS

"SHALLOW PRODUCTION is scarce. You'll get it on my Tennessee structures." N. M. Sauls, Geologist, Cookeville, Tenn.

FOR Central Kansas drilling deals see Lewis Short, Burrton, Kansas.

WANTED: Drilling Blocks, large or small, wildcat or proven. Box G-479, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Oil leases in Heart of Williston Basin, Mountrail County, North Dakota. E. G. Ranum, Valley City, N. D.

WILL SELL nine producing wells on 400 acres with proven locations yet to be drilled. Situated in Western Kansas. Address C. M. Powell, 909 Central Bldg., Wichita, Kans.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully. P. O. Box 2153, Denver Colorado.

HAVE MADE Gravity Meter and Magnetometer surveys and worked up subsurface control over approximately 150,000 acres in East Central Oklahoma. Several good looking drilling locations ranging from 2200 to 2700' depths to test silicious. Need a partner to carry half or three-fourths interest. You can operate or I will operate. Box G-449, The Oil and Gas Journal, Tulsa, Oklahoma.

SEE A. L. Bowles, Rollow Building, Ada, Oklahoma, for drilling deals.

FOR SALE: 26 producing wells located in Salt Flats Field, Luling, Texas. Total production approximately 3500 barrels per month can be increased by close supervision. 5 houses, supplies, and equipment. Plenty of acreage to drill additional wells. A real bargain and a good opportunity to get into the oil business. Priced to sell at $175,000.00. Contact Kenneth Blackmar, Luling, Texas, or Riddle Oil Co., 59 East Van Buren, Chicago 5, Illinois.

NOTICE OF SALE OF OIL, GAS AND MINERAL LEASE

Pursuant to the provisions of Chapter 150 of the General and Special Laws of the State of Texas, passed by the 45th Legislature at its Regular Session, the Board of Directors of the Agricultural and Mechanical College of Texas hereby offers for sale at public auction in the Office of the Comptroller, Room 201-D, System Administration Building, College Station, Texas at 10:00 a.m. Thursday, June 25, 1953, the oil, gas, sulphur and other mineral lease on approximately one thousand four hundred seventeen (1,417) acres of land occupied by the Texas Forest Service, located near Conroe in Montgomery County, Texas, known as a part of the W. Goodrich Jones State Forest, and being the east half of the A. Springer Survey, Abstract No. 490. Only cash bids will be considered. The right is reserved to reject any and all bids. For lease forms and particulars, address Comptroller, Texas Agricultural and Mechanical College System, College Station, Texas.

S. E. NEW MEXICO OIL AREAS

INVESTORS who wish unbiased engineering reports & not promotion matter. Furnished data re-important indicated fields Permian & deep zones. Royalty & leases close to proposed wells.

W. J. PETERMAN, Geologist

Portales **New Mexico**

BIG FRESH OIL BOOM IN LEASES

in Eastern North Dakota — Walsh and Nelson Counties. Wire or write for locations and prices.

F. W. Dyer

1835 Champa, Denver, Colorado

REAL ESTATE

AUTO COURT and trailer park, 1½ blocks off 66 highway in western Arizona. Five double cabins and space for ten trailers. Year round business. Priced for quick sale, $7,500.00 cash. Box G-471, The Oil and Gas Journal, Tulsa, Oklahoma.

HOUSTON, TEXAS. $50,000 Air Conditioned Home, will trade for producing royalty or farm close to Houston. Box G-452, The Oil and Gas Journal, Tulsa, Oklahoma.

BUSINESS OPPORTUNITIES

WANTED: MANUFACTURER and Distributor for the Improved Roll Boomer on a royalty basis or outright purchase. This load binder has many improvements including more take-up, more power and a safety feature. Although established, it needs more distribution. It is fully covered by patents. Nolan Sales Corporation, Tulsa, Okla.

PETROLEUM Engineer wants man experienced drilling production with $10,000 or equivalent equipment to form drilling partnership. I have $10,000. Dallas office, yard space and shop equipment with working access to associates steel supplies. Reply to Arnold Evans, AAA Drilling Company, P.O. Box 6246, Dallas.

FOR SALE
BY ALASKANS

Stock in an Alaskan Corporation with leases on 66,560 acres of government leased ground, unitized in one block 90 air miles from Phillips Petroleums recently acquired property in Alaska. $1.00 per share non-assessable. Once oil is discovered the opportunity for investment is beyond the capacity of the small investor. Each certificate shall be for 100 shares or more.

BROKERS SOLICITED

ALASKA OIL AND GAS DEVELOPMENT CO.
Box 2000
(Please use air mail)
Anchorage, Alaska

ARE ORDERS HARDER TO GET?

If you need greater sales FORCE in selling the petroleum industry, let's discuss your problems.

We have efficient, hard hitting graduated petroleum "sales" engineers backed by top flight management specialists who are trained in the sale and service of specialty drilling products in the U. S. and Canada.

For an interview at your convenience please write or see us at the Tulsa Oil Show.

Box G-473

The Oil and Gas Journal

Tulsa, Oklahoma

ROYALTIES

PRODUCING ROYALTY and overrides for sale. Wire-write-call for particulars. JACK EAGLE, 706 City Natl. Bldg., Okla. City, Okla. REgent 6-7027.

QUICK CASH: Producing royalties, Overrides or Production . . . no delay. Phone 72-4533, Robert L. Kinkaid . . . P.O. Box 26, Tulsa, Oklahoma.

WE will buy producing or non-producing oil royalties. Standard Security Company, 111 Broadway, New York 6, N. Y.

ROYALTIES WANTED
Producing Royalties
High Grade Only
Send Full Particulars
Address

C. C. HARMON
719 World Bldg., Tulsa, Okla.
P.O. Box 2151

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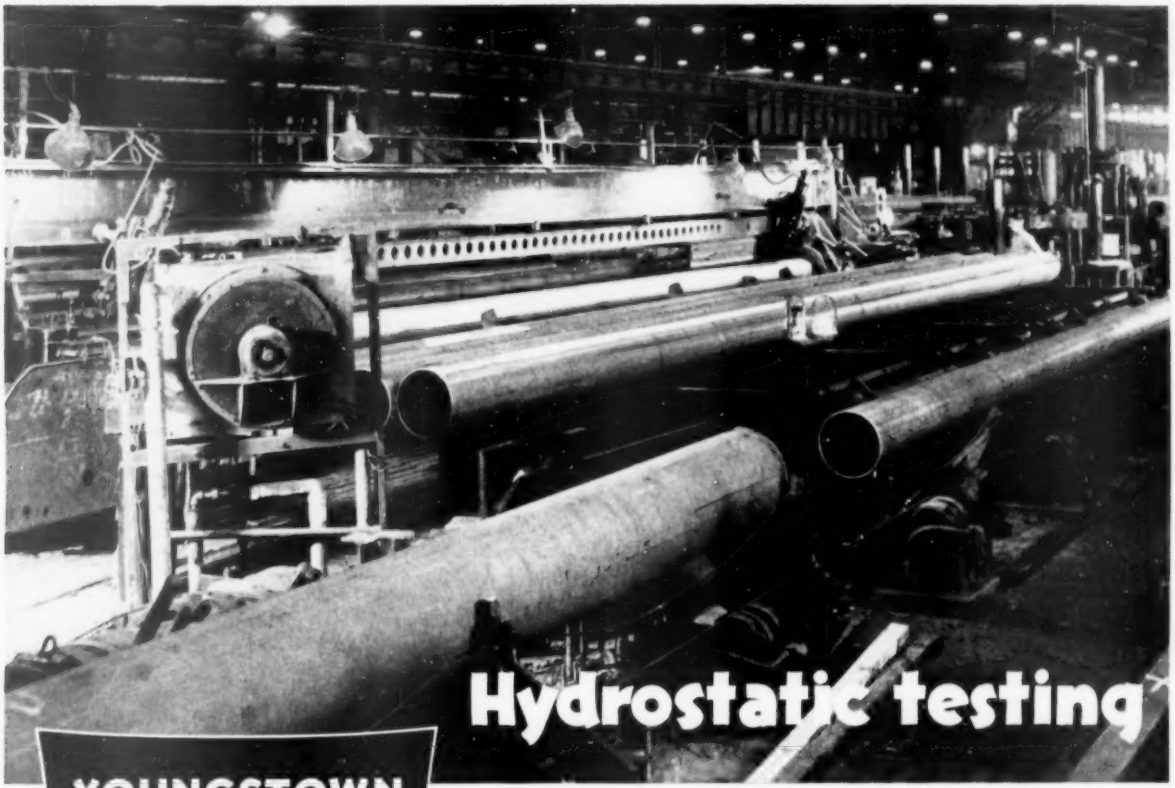
See full size units and scale plastic working models of oil field production equipment in our building on Lot "S"

NATIONAL TANK COMPANY

TULSA, OKLAHOMA



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Electric Weld
LINE PIPE
Uniformly satisfactory in service because—

1. Long lengths save time and trouble
2. Weldability is outstanding
3. It bends readily
4. Line up characteristics are excellent

PROVES EVERY LENGTH

●As a final check on its soundness, every length of Youngstown Electric Weld Pipe undergoes this hydrostatic test. Filled with water under high pressure, the pipe is struck repeatedly along the weld zone with pneumatic hammers. Only perfect pipe can survive such rigorous testing.

Youngstown Electric Weld Pipe for the oil and gas industry is being made in sizes up to 22″ OD and in grades as high as X52. For further information, phone or write our nearest District Sales Office.

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*
General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.
PIPE AND TUBULAR PRODUCTS - CONDUIT - BARS - RODS - COLD FINISHED CARBON AND ALLOY BARS - SHEETS - PLATES - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RAILROAD TRACK SPIKES

Any ONE of these Reasons

is reason enough to always specify

Straight Grip TOOL JOINTS

— are 3 times as strong as the pipe they connect!

Straight Grip TOOL JOINTS

— give positive protection against joint leakage and creep!

Straight Grip TOOL JOINTS

— tighten their seal as the tension load and pump pressure increase!

Straight Grip TOOL JOINTS

— are precision machined and heat-treated to exacting specifications!

Straight Grip TOOL JOINTS

— are quickly and easily installed or removed at the drilling rig!

Straight Grip TOOL JOINTS

— require *no selective fitting* to the drill pipe!

Straight Grip TOOL JOINTS

— provide *4 points of seal* as shown in illustration at right!

Straight Grip TOOL JOINTS

— are designed right . . . made right . . . installed right . . . TRIED AND PROVEN!

AMERICAN IRON Straight Grip TOOL JOINTS

4 POINT SEAL PROTECTION

1. STABILIZER FLUID SEAL
2. THREAD TENSION SEAL
3. INSIDE FLUID SEAL
4. SHOULDER FLUID SEAL

AMERICAN IRON & MACHINE WORKS CO.
MANUFACTURERS OF OIL FIELD EQUIPMENT
A
REG. U.S. PAT. OFF.
OKLAHOMA CITY U.S.A.

Also manufacturers of A.P.I. — "Amweld" (counterbore weld) — "Flash Welded" — and Tubing Tool Joints